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Beef Cattle Production Potential of Set-Aside Land

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ABSTRACT

Nearly 1,200 participants in the 1972 set-aside program planned to expand their beef cow herds by a fourth during the next 3 years. If permitted to fully utilize forage on the 58.8 million acres set aside, without reduced payments, they would increase their beef cow herds by 56 percent in the next 3 years.

Based on the sample results, the national beef cow herd would increase over the next 3 years by an estimated 6.6 million head, or 16 percent if 1972 set-aside provisions prevailed. Another 4.3 million beef cows would be added within 3 years if full utilization of 58.8 million acres of set-aside land were permitted without a reduction in set-aside payments.

Only in the South and the Corn Belt-Lake States could cattlemen profitably accept reductions exceeding 10 percent from 1972 set-aside payments in exchange for year-round forage utilization, unless feeder calf prices exceeded \$45 per hundredweight. Twenty dollars per ton for hay would compensate for reductions of 10 to 20 percent in set-aside payments in the Corn Belt-Lake States, and the eastern fringe of the Northern Plains.

Keywords: Beef cattle, feeder cattle, production potential, agricultural programs, acreage diversions, enumerative survey, budgeting.

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SUMMARY AND CONCLUSIONS

A sample of producers in 23 areas indicated that they would expand their beef cow herds by as much as 56 percent within 3 years if regulations regarding the use of set-aside acres were liberalized. With no change from 1972 set-aside regulations, producers indicated that they would expand herds by a fourth.

If set-aside acres could be grazed year-round for 3 years without a reduction in payment rates, these cattlemen said they would increase cow numbers by 41 percent. If hay in addition could be removed from the set-aside acres, they would expand herds by 46 percent. If they could graze and harvest hay from the set-aside land for the next 10 years without a reduction in payments, beef cow numbers would increase 56 percent in the next 3 years.

These estimates of expanded cow herds are based on the assumption that 58.8 million acres set aside under annual programs in 1972 would remain as such indefinitely. Since the study was completed, the set-aside acreage for 1973 was reduced to 16 million acres, and because of strong demand, 1974 set-aside acreage provisions under annual programs have been eliminated. However, the feasibility of using set-aside land for beef production will continue to be a live issue for the foreseeable future. As production returns to normal in other parts of the world, the United States again will be likely to have excess crop production capacity. Surplus beef production capacity will come much more slowly, if at all.

Based on results of the study, beef cows in the United States would number about 47.7 million head within the next 3 years, an increase of 6.6 million head over late 1972, if future set-aside provisions were similar to those that existed in 1972. Annual increases of slightly more than 5 percent for 3 successive years would provide an increase of this magnitude. By comparison, the inventory increase during 1972 was almost 6 percent.

If, however, an acreage equal to the 1972 set-aside acreage could be grazed year-round, beef cow numbers would increase an additional 2.4 million head within 3 years. Adding an option to harvest hay from set-aside land would result in an additional expansion of 0.7 million cows. Assurance to producers that forage developed on set-aside land could be used without restriction over a 10-year period would lead to a further addition of 1.2 million beef cows within 3 years.

Thus, if the 1972 set-aside acreage were available for year-round forage utilization for the next 3 years, cow herds in the survey areas would expand by an estimated 2.4 to 4.3 million head. More than 85 percent of the expansion probably would occur in the Corn Belt-Lake States, the South, and the Southern Plains.

Cost-and-returns budgets indicate that cattle producers in the western third of the Nation could not profitably exchange any significant reductions in set-aside payments for year-round grazing and haying privileges on set-aside land. Producers in the South and in the Corn Belt-Lake States, however, could accept reductions in set-aside payments of 10 to 20 percent for these privileges if they expected feeder calf prices to average above \$45 per hundred-weight.

A hay price of \$20 per ton net in the field at harvest time would about offset a 10- to 20-percent reduction in set-aside payments for farmers in the Corn Belt-Lake States and the eastern fringe of the Northern Plains. A net price near \$25 per ton would be required to offset significant set-aside payment reductions in other regions.

A group of 1,169 farm operators were interviewed in November and December 1972 to obtain data for this study. These farmers represented a random sample of producers in 23 homogeneous type-of-farming subregions throughout the Nation who owned beef cow herds and participated in the 1972 set-aside program.

The sample producers indicated that they planned to expand their beef herds considerably within the next 3 years, assuming no change from the 1972 set-aside provisions. Average planned expansion ranged from 13 percent of the 1972 inventory in one Texas subregion to 46 percent in the southern Corn Belt. For the 23 subregions combined, producers who were surveyed expected to have almost 24 percent more beef cows in 3 years than they owned at the time of the survey.

Information obtained from the farm operators surveyed indicated that on farms with beef cows in 13 of the 23 study subregions, more than half of the 1972 set-aside acreage was summer fallowed. Fallowing was particularly prevalent in the Northwest and in the western half of the Northern Plains, accounting for three-fourths to 98 percent of all set-aside acreage on the survey farms. Forage development obviously would be necessary before the land could be used for cattle raising.

The quality of vegetative cover varied considerably on set-aside land on survey farms in the Corn Belt, the South, and parts of the Southern Plains. Varying proportions of this land were grazed during periods when grazing was permitted in 1972. In general, however, forage quality, productivity, and utilization of forage on set-aside land were rather low. Considerable investment in forage establishment or improvement would be needed to obtain the full cattle-raising potential of most of this land, particularly in the South. Fencing also would have to be added to make much of the set-aside acreage useful for year-round grazing.

Cost-and-returns budgets for beef cow-calf enterprises indicated that producers in the South, the Corn Belt-Lake States, and the eastern fringes of the Northern Plains could afford to expand feeder cattle production on set-aside land at an average feeder calf price of about \$30 per hundredweight if they had enough unused labor, buildings, and machinery to accommodate the additional cattle. An average calf price of about \$35 per hundredweight would be required to cover the direct costs of expanding feeder cattle production on set-aside

land in the Southwest. Because of the relatively high returns from fallowing cropland in the western portion of the Northern Plains and the Northwest, an average calf price of \$40 or more per hundredweight was estimated to be necessary to justify switching set-aside land from summer fallow to the production of forage crops for beef cows, even if cattle labor and facilities are available at no cost.

To cover the total costs of expanding feeder cattle production on set-aside land, calf prices would generally have to be between \$5 and \$10 per hundredweight above the level that would cover direct production costs in the various regions.

The estimates in this report were based on specific assumptions about set-aside provisions. Additional research would be required to incorporate different set-aside acreages, regional distributions, or use provisions into this analysis.

BEEF CATTLE PRODUCTION POTENTIAL OF SET-ASIDE LAND

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INTRODUCTION 1/

Prices of beef in the United States have been rising as domestic demand for beef has increased faster than available supplies. The relaxation of meat import restrictions can be expected to provide only limited help toward the solution of this problem, because little of the potential supply of beef imports is of the type and quality of retail cuts most strongly demanded in the United States. Thus, there is a need, at least from the viewpoint of consumers, to increase domestic production of grain-fed beef. Because virtually all suitable cattle in the United States are currently grain fed, substantial increases in domestic beef production can be achieved only through an expansion in the supply of feeder cattle. This situation has emphasized the need for analyzing the feeder cattle production potential of underused forage resources.

1/ This report summarizes research conducted by the following Economic Research Service Task Force: C. C. Boykin, College Station, Tex.; C. P. Butler, Clemson, S. C.; F. T. Cooke, Jr., Stoneville, Miss.; C. K. Gee, Fort Collins, Colo.; H. C. Gilliam, Jr., Raleigh, N. C.; R. D. Krenz, Fargo, N. Dak.; W. F. Lagrone, Lincoln, Nebr.; G. E. Rodewald, Pullman, Wash.; J. G. Stovall, Washington, D. C.; R. N. Van Arsdall, Urbana, Ill.; and James Vermeer, Washington, D. C. Others in ERS who contributed to the study include R. D. Johnson, Lincoln, Nebr.; C. C. Micheel, Fargo, N. Dak.; and E. O. Ullrich, Brookings, S. Dak.

A total of 58.8 million acres of cropland was set aside in the United States in 1972 under provisions of the cotton, feed grain, and wheat programs. ^{2/} Under the 1972 programs, no forage could be harvested from set-aside land, and grazing of this land was prohibited during the 5 principal months of the normal growing season, unless officially declared emergency conditions developed. Thus, set-aside acreage represents, in varying degrees, potential sources of additional forage which might be used to expand beef cow and consequently feeder cattle numbers. Further, the use of set-aside land to produce grazing or hay for beef cows offers the possibility of reducing Government set-aside payments while maintaining producer incomes.

Objectives

The major objective of this research was to analyze the effects of alternative provisions concerning the use of set-aside land on future feeder cattle numbers and on feasible program payment rates. Specific questions addressed here are:

1. What additions to feeder cattle numbers might be expected 3 years from now if farmers were allowed without restriction or penalty to:
 - a. Graze set-aside land for the next 3 years,
 - b. Graze or harvest hay, or both, from set-aside land for the next 3 years, or
 - c. Graze or harvest hay, or both, from set-aside land over the next 10 years?
2. How much reduction in set-aside payments would be feasible under each of the options listed above?

Some adjustment in feeder cattle numbers could be expected in response to recent increases in beef prices, even with no greater utilization of set-aside acreage than was permitted in 1972. A corollary objective was to estimate the extent of this adjustment.

^{2/} Recently announced changes in provisions of these programs are expected to reduce set-aside acreage to about 16 million acres in 1973. No cropland set-aside will be required as a condition of eligibility for the 1973 cotton program, while 2 million acres were set aside under the 1972 cotton program. Deletion of the mandatory set-aside requirement for eligibility to receive wheat certificate payments in 1973 will reduce wheat set-aside acreage, perhaps by about 13 million acres. A reduction of about 28 million acres has been suggested as likely because of changes in the 1973 feed grain program provisions. No land will be set aside under annual programs in 1974. All of these changes were announced after the research summarized in this report was underway.

Procedure

Interrelationships among many factors, such as the availability, productivity, and established uses of set-aside acres and the organization of farms in general, affect the response of farmers to options to graze or take hay from set-aside land. Therefore, this analysis was conducted in each major production region where set-aside acreage and feeder cattle production are important. The regions selected were the (1) South, (2) Corn Belt and Lake States, (3) Northern Plains, (4) Southern Plains, and (5) Northwest. Researchers who are familiar with the economics of beef production and local farming situations in each of these regions participated in the study.

Agricultural Stabilization and Conservation Service (ASCS) data on program participation, data from the June 1972 Statistical Reporting Service (SRS) Enumerative Survey, and information from the 1969 Census of Agriculture were used to delineate 23 smaller subregions for primary analysis. Each of these subregions was chosen to represent a relatively homogeneous type-of-farming area within which grazing or hay harvesting options on set-aside land might offer considerable potential for expanded feeder cattle production.

Two sample counties were selected at random within each subregion for detailed study. ASCS data concerning farm size, organization, cropland use, and crop yields were obtained for a randomly selected list of participants in the 1972 set-aside program in each sample county. A randomly chosen subsample of these farm operators who had beef cows as well as set-aside acreage in 1972 was interviewed during November and December 1972. Specific information was obtained about the use of their cropland and noncropland forage resources, set-aside acreages, livestock inventories, and future feeder cattle production plans with 1972 or specified alternative restrictions on permissible uses of set-aside land.

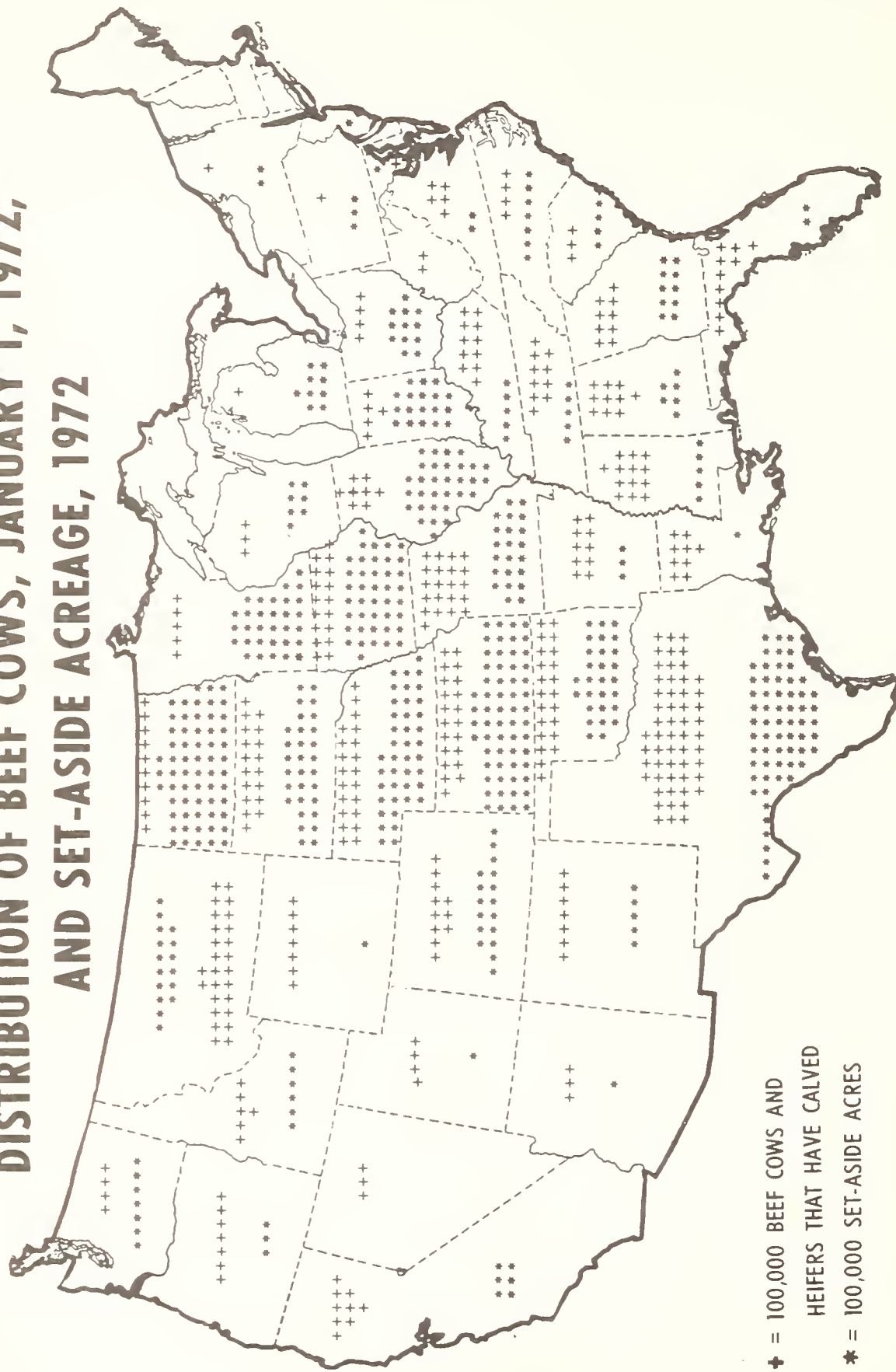
Partial budgeting was used to analyze cost-and-returns relationships required to make expanded feeder cattle production economically feasible for typical farm operators in the study subregions, given the various assumed options concerning the use of set-aside land. These budgets, in combination with stated resource constraints and production intentions of the sample of farm operators who were interviewed, were used as the bases for estimating future feeder cattle numbers. These same considerations were also involved in estimating changes in set-aside payment rates that producers could accept without loss of income.

STUDY SUBREGIONS

Figure 1 depicts the 1972 distribution by States of beef cows and set-aside acreage. Large proportions of the national totals of both are included in the Corn Belt-Lake States and the Northern and Southern Plains, where the production of feed grains and wheat, respectively, are concentrated. Significant shares of both, however, are also included in the South and West.

These State data provided an initial basis for the selection of study subregions. However, climatic, topographic, and land resources, as well as crop and livestock production patterns, vary greatly within States. Thus, counties, the smallest geographic units for which many data are available, were used to

DISTRIBUTION OF BEEF COWS, JANUARY 1, 1972, AND SET-ASIDE ACREAGE, 1972



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Figure 1

delineate the subregions selected for study. Each subregion represents a type-of-farming area that was believed to have considerable potential for expanding feeder cattle production. Based on available data and the knowledge of the individual researchers, a county was included in one of the subregions only if the county (1) contained a significant acreage of set-aside land--approximately 10,000 acres or more, (2) was considered typical, as regards crop and livestock production patterns, of the entire subregion, and (3) was estimated to include at least 50 farm operators with both set-aside land and beef cow herds. The resulting 23 subregions are shown in figure 2.

Land Resources, Beef Cows, and Set-Aside Acreage

A total of 449 counties are included in the 23 study subregions, which contained from 11 to 36 counties each. According to the 1969 Census of Agriculture, total farmland in the individual subregions ranged from 2.9 million acres in subregion 2 to 18.1 million acres in subregion 15 (table 1). Cropland acreages ranged from 1.5 million to 11.7 million acres in subregions 2 and 15, respectively. As a proportion of all farmland, cropland ranged from only 28 percent in subregion 21, where rangeland comprises a large proportion of all farmland, to 88 percent in subregion 5, the heart of the cash grain portion of the Corn Belt. For the 23 subregions combined, cropland constitutes about 61 percent of all farmland.

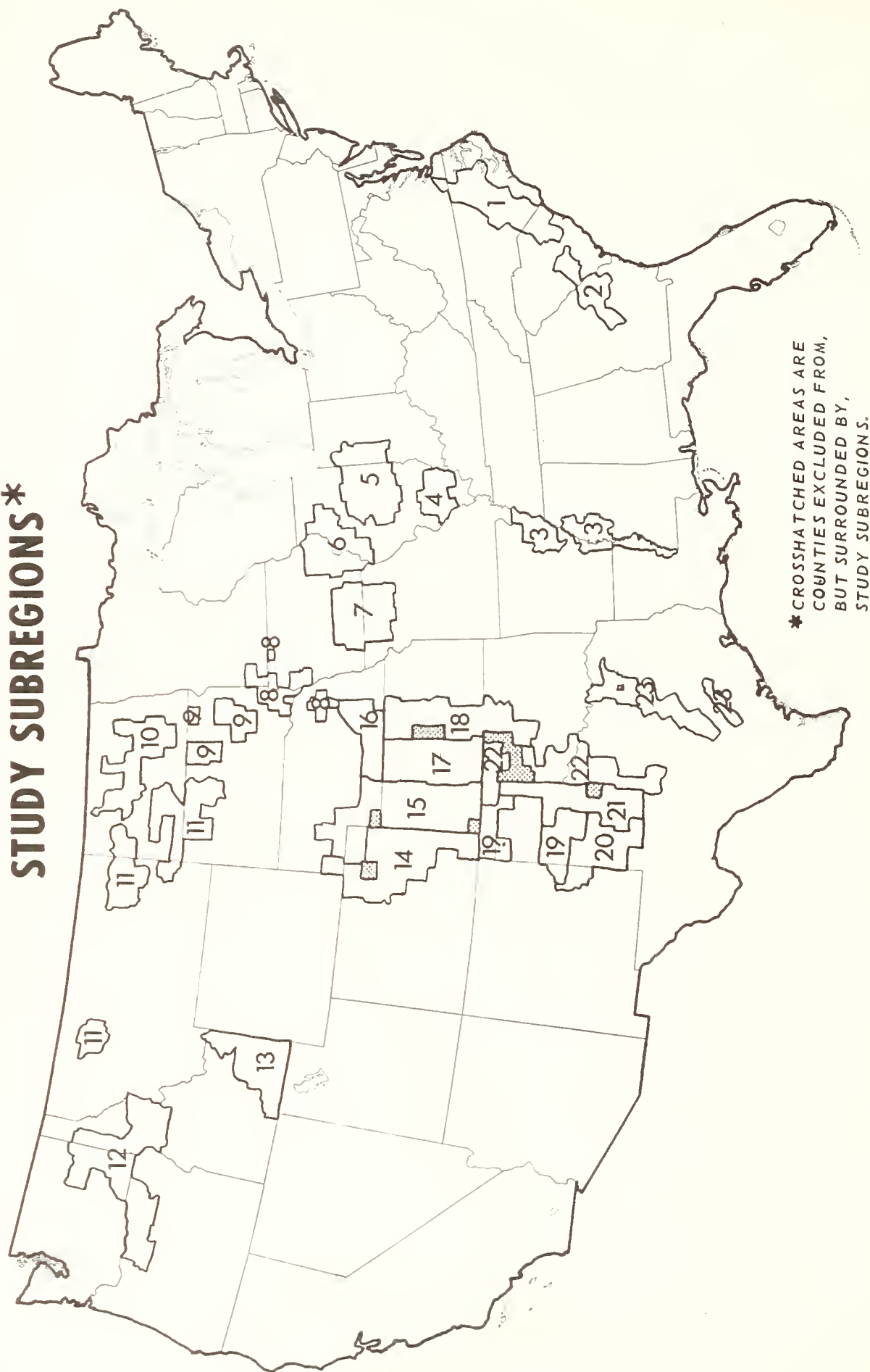
Beef cow numbers in the individual study subregions in 1969 ranged from 67,987 to 682,706 head (table 2). The heaviest concentration of beef cows relative to all farmland occurred in subregion 7, in southern Iowa and northern Missouri. Beef cow numbers per 1,000 acres of cropland, however, were greatest in subregion 23, the Blackland Prairies area of Texas.

A total of 6.6 million beef cows, nearly one-fifth of the national inventory in 1969, were maintained on farms in the 23 subregions combined (table 2). The combined study area had, on the average, 20.2 acres of cropland and 13.1 acres of other farmland per beef cow.

Farm operators in the 23 study subregions had 23.7 million acres of set-aside land in 1972--about 40 percent of the national total (table 3). Set-aside acreage averaged 17.8 percent of the cropland acreage in the combined study area.

In the individual subregions, set-aside acreage generally averaged from 10 to 25 percent of cropland acreage. The exceptions were subregion 3, the Mississippi Delta, and subregion 19, the northern Texas High Plains. In the Delta less than 5 percent of all cropland was set aside, primarily in connection with the upland cotton program. In the Texas subregion, set-aside land was 32 percent of cropland. Feed grain, wheat, and cotton all contributed significantly to the total acreage set aside in this subregion.

STUDY SUBREGIONS*



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Figure 2

Table 1.--Land resources in study subregions, 1969^{1/}

	:	:	:	:	:	:	Cropland
	:	:	:	:	:	:	as a
	:	:	:	Farmland	:	Cropland	percent
	:	:	:	:	:	:	of all
Subregion	Counties	Farms	Total	Per farm	Total	Per farm	farmland
	No.	No.	1,000	Acres	1,000	Acres	Percent
			acres		acres		
1-----	26	50,911	5,847.2	115	3,038.6	60	52.0
2-----	15	10,939	2,912.2	266	1,540.1	141	52.9
3-----	21	14,045	6,775.3	482	5,536.0	394	81.7
4-----	14	15,083	3,381.4	224	2,706.3	179	80.0
5-----	31	40,058	10,798.8	270	9,544.8	238	88.4
6-----	25	36,895	8,446.3	229	6,859.7	186	81.2
7-----	31	36,152	9,395.6	260	6,678.1	185	71.1
8-----	17	21,527	5,871.9	273	5,045.5	234	85.9
9-----	11	8,450	5,773.2	683	4,073.8	482	70.6
10-----	11	10,923	9,156.5	838	7,245.7	663	79.1
11-----	15	9,608	17,996.7	1,873	6,838.1	712	38.0
12-----	18	11,477	12,391.8	1,080	6,430.7	560	51.9
13-----	12	7,950	5,389.7	678	2,742.7	345	50.9
14-----	14	10,012	15,627.5	1,561	6,930.2	692	44.3
15-----	36	15,465	18,141.6	1,173	11,693.5	756	64.5
16-----	18	14,924	6,165.3	413	4,629.9	310	75.1
17-----	22	15,205	12,121.5	797	7,641.4	503	63.0
18-----	24	30,321	12,997.3	429	9,258.1	305	71.2
19-----	13	9,944	9,789.1	984	5,977.6	601	61.1
20-----	14	11,211	8,689.0	775	5,456.3	487	62.8
21-----	19	9,210	10,336.5	1,122	2,934.6	319	28.4
22-----	24	21,438	14,419.6	673	6,601.0	308	45.8
23-----	18	31,600	8,329.8	264	4,345.6	138	52.2
Total	449	443,348	220,753.8	---	133,748.3	---	60.6

^{1/}Based on data from the 1969 Census of Agriculture.

Table 2.--Number and concentration of beef cows in study subregions, 1969^{1/}

Subregion	:	Total beef cows	:	Beef cows per 1,000 acres ^{2/}	
				Farmland	Cropland
1-----	:	67,987	:	11.6	22.4
2-----	:	85,795	:	24.3	45.9
3-----	:	115,747	:	17.1	20.9
4-----	:	92,352	:	27.3	34.1
5-----	:	203,794	:	18.9	21.4
6-----	:	364,031	:	43.1	53.1
7-----	:	682,706	:	72.7	102.2
8-----	:	227,591	:	38.8	45.1
9-----	:	280,233	:	48.5	68.8
10-----	:	191,433	:	20.9	26.4
11-----	:	432,317	:	24.0	63.2
12-----	:	209,675	:	16.9	32.6
13-----	:	172,066	:	31.9	62.7
14-----	:	330,953	:	21.2	47.8
15-----	:	452,294	:	24.9	38.7
16-----	:	235,174	:	38.1	50.8
17-----	:	387,211	:	31.9	50.7
18-----	:	473,804	:	36.5	51.2
19-----	:	212,157	:	21.7	35.5
20-----	:	87,511	:	10.1	16.0
21-----	:	280,648	:	27.2	95.6
22-----	:	464,380	:	32.2	70.3
23-----	:	571,698	:	68.6	131.6
<hr/>					
Total	:	6,621,557	:	29.9	49.4

^{1/}Based on data from the 1969 Census of Agriculture.

^{2/}See table 1 for farmland and cropland acreages.

Table 3.--Set-aside acreage in study subregions, 1972

Subregion	Total set-aside acreage ^{1/}	Set-aside acreage as a percent of cropland ^{2/}
	<u>Acres</u>	<u>Percent</u>
1-----	501,936	16.5
2-----	281,931	18.3
3-----	253,003	4.6
4-----	329,042	12.2
5-----	1,203,686	12.6
6-----	900,549	13.1
7-----	676,822	10.1
8-----	842,565	16.7
9-----	603,148	14.8
10-----	1,424,219	19.7
11-----	1,370,723	20.0
12-----	700,405	10.9
13-----	323,889	11.8
14-----	1,349,667	19.5
15-----	2,459,355	21.0
16-----	1,125,152	24.3
17-----	1,674,632	21.9
18-----	1,806,989	19.5
19-----	1,905,693	31.9
20-----	1,221,005	22.4
21-----	718,193	24.5
22-----	1,577,147	23.9
23-----	492,514	11.3
Total		
	23,742,265	17.8

^{1/}Based on data from "1972 Set-aside Program, Preliminary Annual Report, Feed Grain, Wheat, and Upland Cotton Programs, Summary," Agr. Stabilization and Conserv. Serv.

^{2/}1972 set-aside acreage as a percentage of 1969 cropland acreage (see table 1).

Sample Farms

Acreage of set-aside land and beef cow numbers cited above provide some indications of the potential for expanding feeder cattle production through the use of set-aside land. Future use of these resources, however, will obviously be controlled by individual farm operators, so the need for information concerning resource availability and use on individual farms was apparent.

Two sample counties in each subregion were selected at random for intensive study. Study emphasis within the sample counties was concentrated on farms that had both set-aside land and beef cows in 1972, because feeder cattle production response to changes in permissible uses of set-aside land are most likely to occur first on farms that have some facilities for and experience in managing beef cow herds.

ASCS personnel in each sample county provided records and assistance which were used to select a random sample of farm operators in the county who had set-aside land in 1972. The sample was then divided, with the aid of ASCS personnel, into lists of farm operators who did and those who did not own beef cows in 1972. 3/

Operators of sample farms with beef cows controlled from 21 to 96 percent of the farmland acreages in the individual subregions (table 4). They also controlled similar, though usually slightly smaller, proportions of cropland per subregion. Using total farmland as a measure, farms with beef cows in each subregion were larger than those without. At the extreme, farms with beef cows in the sample counties of subregions 9 and 22 were more than three times as large as those with no beef cows. Cropland acreages per farm were also greater on farms with beef cows in every subregion except 13.

Few major differences were apparent in cropland use patterns on farms with versus those without beef cows in the individual subregions. For crops that occupied large acreages in a subregion, the percentages grown on farms with beef cows tended to correspond rather closely with the percentage of all cropland on such farms (table 5).

Farm operators who now have beef cows were assumed to respond more quickly to any opportunity to graze set-aside land year-round. Such operators had from 21 to 95 percent of the total set-aside land in the various subregions in 1972 (table 6).

As in the case of cropland, the average set-aside acreage of farms with beef cows was greater than on farms with no cows in every subregion except 13. In general, the average acreage of set-aside land per farm within the various subregions in 1972 was large enough to have provided forage for several additional brood cows if it had been permissible to fully utilize the land for this purpose (table 6).

3/ Details concerning selection of the farm operator sample are presented in the appendix.

Table 4.--Farmland and cropland as percentages of total land, and acreages per farm, sample farms with and without beef cows, subregions, 1972 ^{1/}

Subregion:	Percent of land				Acreage per farm			
	Farmland		Cropland		Farmland		Cropland	
	Farms	Farms	Farms	Farms	Farms	Farms	Farms	Farms
	with	without	with	without	with	without	with	without
	beef	beef	beef	beef	beef	beef	beef	beef
	cows	cows	cows	cows	cows	cows	cows	cows
	Percent	Percent	Percent	Percent	Acres	Acres	Acres	Acres
1-----:	30.3	69.7	30.4	69.6	407	200	186	90
2-----:	51.3	48.7	55.8	44.2	831	478	374	179
3-----:	20.6	79.4	19.6	80.4	1,149	527	922	450
4-----:	49.2	50.8	47.7	52.3	377	283	275	219
5-----:	59.6	40.4	55.5	44.6	362	210	255	176
6-----:	59.2	40.8	57.1	42.9	337	212	255	175
7-----:	70.1	29.9	68.0	32.0	385	232	268	179
8-----:	63.5	36.5	61.0	39.0	343	265	260	223
9-----:	96.3	3.7	95.1	4.9	1,389	397	745	280
10-----:	52.9	47.1	49.0	51.0	1,006	833	701	678
11-----:	76.7	23.3	71.9	28.1	1,961	1,221	1,042	837
12-----:	87.1	12.9	80.9	19.1	4,128	2,434	1,947	1,822
13-----:	43.4	56.6	38.1	61.9	673	594	450	495
14-----:	72.1	27.9	78.0	22.0	2,351	2,117	2,034	1,334
15-----:	42.1	57.9	33.7	66.3	1,365	945	763	757
16-----:	47.7	52.3	46.4	53.6	498	405	418	358
17-----:	68.9	31.1	64.1	35.9	1,226	573	699	405
18-----:	54.1	45.9	49.8	50.2	845	578	566	460
19-----:	37.1	62.9	34.3	65.7	1,172	683	916	603
20-----:	28.7	71.3	19.8	80.2	1,497	600	773	504
21-----:	87.7	12.3	80.0	17.0	1,634	651	576	336
22-----:	96.0	4.0	92.8	7.2	1,200	394	365	219
23-----:	90.9	9.1	90.3	9.7	392	192	309	161

^{1/}Derived from ASCS data for sample farms. Only farms with set-aside land in 1972 were included in the sample.

Table 5.--Percentages of cropland, total and planted to specified crops, on sample farms with beef cows, by subregions, 1972 ^{1/} 2/

		Acreage of crops planted for harvest in 1972									
Subregion	Cropland	Corn	Grain	Soybeans	Cotton	Barley	Winter	Spring	Oats		
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1-----	30.4	35.6	2/	21.8	30.8	2/	27.2	---	2/	---	2/
2-----	55.8	55.1	2/	55.2	63.4	2/	70.6	---	2/	---	2/
3-----	19.6	29.9	2/	19.3	19.9	2/	21.7	---	2/	---	2/
4-----	47.7	42.2	49.3	40.4	---	2/	42.4	---	---	---	---
5-----	55.4	55.0	89.4	53.8	---	---	55.5	---	---	---	53.4
6-----	57.1	55.8	2/	52.6	---	---	20.4	---	---	---	69.7
7-----	68.0	59.1	88.6	62.8	---	---	97.2	---	---	---	59.7
8-----	61.0	59.2	56.9	55.2	2/	53.6	55.8	2/	75.3	2/	75.3
9-----	95.1	95.2	85.2	2/	---	97.3	2/	93.3	95.4	93.3	95.4
10-----	49.0	61.5	---	---	---	41.9	2/	46.2	51.3	46.2	51.3
11-----	71.9	89.5	2/	---	---	77.1	61.8	82.1	79.1	82.1	79.1
12-----	80.9	2/	---	---	---	78.8	80.0	---	2/	---	2/
13-----	38.1	2/	---	---	---	33.0	50.3	23.7	2/	23.7	2/
14-----	78.0	64.9	66.3	---	---	2/	69.4	---	---	---	---
15-----	33.7	36.3	39.2	---	---	49.8	30.6	---	2/	---	2/
16-----	46.4	46.8	43.6	42.8	---	---	47.9	---	2/	---	2/
17-----	64.1	2/	66.0	---	---	2/	59.8	---	2/	---	2/
18-----	49.8	2/	60.0	---	---	40.1	49.5	2/	2/	2/	2/
19-----	34.3	16.3	28.9	35.8	34.6	2/	43.7	---	---	---	---
20-----	19.8	2/	16.4	2/	17.1	2/	46.4	---	---	---	---
21-----	83.0	2/	78.5	2/	83.1	2/	79.6	---	---	---	80.7
22-----	92.8	2/	92.1	---	94.8	2/	93.0	---	---	---	91.2
23-----	90.3	2/	91.8	2/	91.0	2/	86.6	---	---	---	97.5

^{1/} Derived from ASCS data for sample farms. Only farms with set-aside land in 1972 were included in the sample.

^{2/} Interpretation of the data may be illustrated as follows: Sample farm operators who owned beef cows in 1972 controlled 30.4 percent of the cropland on all sample farms in subregion 1. These operators with beef cows planted 35.6 percent of the 1972 corn acreage on all sample farms in the subregion, 21.8 percent of the soybean acreage, 30.8 percent of the cotton acreage, etc. By implication sample farm operators in subregion 1 who owned no beef cows accounted for 69.6 percent of the cropland, 64.4 percent of the 1972 corn acreage, etc.

^{3/} Nonsignificant acreage grown in the subregion.

Table 6.--Percentage of set-aside land and acreage per farm
on sample farms with and without beef cows, by subregions, 1972^{1/}

Subregion	Percent of set-aside land		Acres of set-aside land per farm	
	Farms with	Farms without	Farms with	Farms without
	beef cows	beef cows	beef cows	beef cows
	<u>Percent</u>	<u>Percent</u>	<u>Acres</u>	<u>Acres</u>
1-----:	28.7	71.3	26	14
2-----:	57.3	42.7	69	31
3-----:	21.9	78.1	64	27
4-----:	46.3	53.7	46	39
5-----:	59.0	41.0	45	27
6-----:	56.6	43.4	42	30
7-----:	68.2	31.8	41	27
8-----:	60.0	40.0	54	48
9-----:	94.2	5.8	148	67
10-----:	50.0	50.0	156	145
11-----:	72.7	27.3	279	215
12-----:	60.9	39.1	213	544
13-----:	38.8	61.2	61	65
14-----:	87.6	12.4	1,076	353
15-----:	34.7	65.3	198	188
16-----:	46.1	53.9	109	95
17-----:	65.8	34.2	166	89
18-----:	50.1	49.9	129	104
19-----:	36.9	63.1	299	176
20-----:	21.2	78.8	170	102
21-----:	81.8	18.2	143	90
22-----:	94.8	5.2	73	31
23-----:	90.8	9.2	43	21
:				

^{1/}Derived from ASCS data for sample farms. Only farms with set-aside land in 1972 were included in the sample.

SET-ASIDE LAND ON SAMPLE FARMS WITH BEEF COWS

Many factors affect the operational and economic feasibility of using set-aside land to produce feeder cattle. Farmers with both set-aside acreage and beef cows in 1972 were interviewed during November and December 1972 to obtain information on some of these factors that could not be analyzed from ASCS records or other secondary sources. A total of 1,169 farmers were interviewed in the 46 sample counties. ^{4/}

Acreage per Farm

In 13 of the study subregions, the average acreage of set-aside land per farm surveyed was larger than the acreage of cropland used primarily for pasture and hay in 1972 (table 7). Set-aside acreage was more than half as great as other cropland pasture and hay acreage in all but five of the other subregions. Thus, although the relative amounts of cropland and noncropland used for forage production varied greatly from subregion to subregion, the 1972 set-aside acreage could have represented a substantial addition to the total forage supply.

Cover and Use

More than half of the set-aside land on survey farms in 13 of the 23 subregions was summer fallowed in 1972 (table 8). Fallowing of set-aside land was particularly prevalent in the West and the Northern and Central Plains areas, where this practice contributes to profitable crop yields. Nearly 80 percent of the set-aside land was also fallowed in subregion 3, the Mississippi Delta, where the skipped rows in cotton fields qualified as set-aside acreage. This practice also contributed to fallowed set-aside acreage in subregions 19-23.

With the exception of idle land with little or no vegetative cover, and small acreages planted in sunflowers, safflowers, or crambe in a few of the subregions, vegetation suitable in varying degrees for grazing was produced on the set-aside land that was not fallowed. More than 75 percent of the total set-aside acreage in 7 subregions was in this category in 1972 (table 8). The predominant types of vegetation on this land varied considerably. In subregion 1, the northern part of the Coastal Plain, native cover, primarily crabgrass and broadleaf weeds, covered more than three-fourths of the set-aside acreage. Since these species grow during the summer, when set-aside grazing was prohibited, and are rather unpalatable when mature, little usable forage was available in 1972 from this land. By contrast, common bermudagrass, which was the cover on most of the set-aside acreage in subregion 2, can be accumulated in the summer and grazed in the fall. Forage grasses or legume-grass mixtures were also predominant in the Corn Belt subregions. Although new seedings which had not become fully productive and old stands that were past the peak production stage probably comprised much of this acreage, considerable forage was produced which might be used for early fall grazing.

^{4/} The number of farms surveyed in each subregion is discussed in the appendix.

Table 7.--Acreages per farm used for forage production and for set-aside land on survey farms, by subregions, 1972^{1/}

Subregion	Cropland : pasture and : hayland :	Noncropland : pasture :	Total :	Crop : residue : used ^{2/} :	Set-aside
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
1-----	39.0	16.8	55.8	17.7	35.0
2-----	48.2	30.0	78.2	35.6	61.9
3-----	92.9	55.2	148.1	124.6	37.1
4-----	73.8	46.9	120.7	17.9	40.8
5-----	33.4	86.2	119.6	93.0	44.6
6-----	46.0	84.0	130.0	99.8	45.6
7-----	93.8	93.5	187.3	76.3	33.6
8-----	46.2	115.7	161.9	118.9	62.9
9-----	362.2	1,232.6	1,594.8	309.5	170.8
10-----	111.9	433.1	545.0	133.8	158.9
11-----	208.4	836.7	1,045.1	251.0	237.5
12-----	453.9	2,274.3	2,728.2	871.0	105.0
13-----	153.0	501.3	654.3	164.9	76.8
14-----	148.5	1,271.9	1,420.4	789.3	203.9
15-----	59.9	873.0	932.9	175.4	83.8
16-----	24.6	96.6	121.2	161.4	101.8
17-----	102.8	693.5	796.3	70.8	162.6
18-----	46.7	301.8	348.5	4.6	120.1
19-----	191.3	394.4	585.7	188.6	296.1
20-----	67.3	724.2	791.5	88.2	194.0
21-----	94.7	1,190.9	1,285.6	48.8	142.8
22-----	158.0	873.5	1,031.5	82.2	84.6
23-----	170.8	78.2	249.0	12.5	74.7

^{1/}Derived from survey data.

^{2/}Acreages of small grains grazed but later harvested for grain are not included.

Table 8.--Proportions of set-aside acreage in summer fallow and vegetative cover and proportions grazed on survey farms, by subregions, 1972^{1/}

Subregion	Summer cover on set-aside land ^{2/}		Set-aside acreage grazed ^{3/}
	Fallowed, no vegetation	Vegetative cover	
	Percent	Percent	Percent
1-----	1.2	98.8	16.9
2-----	.0	100.0	63.3
3-----	78.8	21.2	22.2
4-----	9.7	89.9	17.7
5-----	2.1	97.9	63.4
6-----	.9	96.9	48.9
7-----	16.3	80.4	54.7
8-----	35.6	48.3	31.2
9-----	58.1	39.3	43.3
10-----	96.7	2.4	2.0
11-----	96.1	3.9	2.8
12-----	93.4	6.6	50.9
13-----	92.7	7.3	12.3
14-----	76.3	11.3	29.3
15-----	85.6	14.4	10.9
16-----	80.7	19.2	19.0
17-----	98.5	1.5	1.2
18-----	14.1	85.9	70.1
19-----	63.6	36.4	35.1
20-----	68.3	31.7	38.4
21-----	29.7	70.3	64.6
22-----	46.4	53.6	42.2
23-----	68.5	31.5	24.7

^{1/}Derived from survey data.

^{2/}Set-aside acreage used to grow approved nonforage crops, such as sunflowers or crambe, and idle acreage on which vegetative cover was insignificant are not included.

^{3/}Grazing of set-aside land was permitted in 1972 except during the 5 principal months of the normal growing season.

Species such as sudan grass and forage sorghums, that can be grown in the summer and grazed in the fall, occupied most of the nonfallowed set-aside land in the Southern Plains study areas, subregions 18-23. In addition, much of the summer-fallowed set-aside land in these subregions is seeded to wheat in the fall. The wheat grows during the season in which set-aside grazing was permitted in 1972, and was thus available as potential forage. Wheat was the only vegetative cover grown on set-aside land in the Mississippi Delta, subregion 3.

The proportions of set-aside acreage that were grazed during the permissible periods of 1972 appear generally consistent with the availability and suitability of vegetation for livestock forage. Only 17 percent of the total acreage was grazed in subregion 1, although virtually all of the acreage was in vegetative cover. On the other hand, the percentages of set-aside acreage grazed exceeded percentages in summer cover in 6 subregions (table 8). In subregions 3, 12, 13, 14, and 20, winter grazing of wheat on land that had been summer-fallowed is indicated. In subregion 9, located in the Northern Plains, the proportion of set-aside that was grazed was not appreciably larger than the proportion with a vegetative cover.

Fencing and Livestock Water

Although more of the set-aside acreage was fenced than was grazed in 1972 in most subregions, lack of adequate fencing no doubt prevented or restricted the grazing of some set-aside parcels. In subregions 2, 3, 5, 6, and 7, higher proportions of the set-aside acreage were grazed than were completely enclosed in fence (table 9). This indicates that livestock were grazed on fields in which set-aside land and other cropland were not fenced separately. The set-aside land was thus unavailable for grazing until after crops were harvested on the portions of these fields not set aside (or before the dates when grazing had to be terminated on small grains that were subsequently harvested). With grazing prohibited during 5 summer months under provisions of the 1972 programs, delaying grazing until after harvest was probably not very costly in terms of reduced utilization of forage on the set-aside land. Complete fencing would be a necessity, however, for year-round grazing.

In addition to fencing, the availability or cost of providing water for livestock affects the feasibility and profitability of grazing set-aside land. Water was obviously available on or near set-aside land that was grazed on the survey farms. According to the farm operators surveyed, water was also available on from about one-third to all of the acreage that was not grazed in the various subregions (table 10). Considerably smaller proportions of the ungrazed acreages, ranging from less than 1 percent in the Mississippi Delta to more than two-thirds in the eastern portion of the Rolling Plains of Texas, had both water and complete fencing, however. Thus, the acreage of ungrazed set-aside land that had both fencing and water averaged 10 acres or more per farm in 13 of the study subregions (table 10). Except for subregion 8, these were drier areas where much of the set-aside acreage was fallowed, and lack of vegetative cover was apparently a major constraint to grazing. Consequently, it appears that significant investments for forage establishment, fencing, or water development would be required to obtain grazing on most of the set-aside acreage that was not grazed in 1972.

Table 9.--Proportions of set-aside acreages completely^{1/}fenced and grazed
on survey farms, by subregions, 1972^{2/}

Subregion	Completely fenced ^{2/}	Grazed
	Percent	Percent
1-----	29.0	16.9
2-----	54.8	63.3
3-----	15.5	22.2
4-----	40.5	17.7
5-----	60.3	63.4
6-----	40.4	48.9
7-----	30.0	54.7
8-----	67.4	31.2
9-----	76.5	43.3
10-----	13.9	2.0
11-----	6.4	2.8
12-----	55.4	50.9
13-----	23.8	12.3
14-----	44.6	29.3
15-----	28.5	10.9
16-----	57.1	19.0
17-----	38.3	1.2
18-----	78.2	70.1
19-----	58.2	35.1
20-----	56.6	38.4
21-----	73.7	64.6
22-----	75.0	42.2
23-----	33.0	24.7

^{1/}Derived from survey data.

^{2/}Fencing adequate to confine livestock to set-aside acreage alone. Includes permanent and temporary (electric) fencing.

Table 10.--Ungrazed set-aside land with livestock water and both fencing and livestock water available, proportions and acreages per farm on survey farms, by subregions, 1972^{1/}

Subregion	Total		Livestock water available		Fenced and water available ^{2/}	
	acres		Acres		Acres	
	per		per		per	
	farm	Proportion	farm	Proportion	farm	
	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	
1-----	29.1	35.7	10.4	17.5	5.1	
2-----	22.7	37.0	8.4	16.3	3.7	
3-----	28.9	37.7	10.9	.4	.1	
4-----	33.6	74.2	24.9	25.5	8.6	
5-----	16.3	32.7	5.3	2.7	.4	
6-----	23.3	42.5	9.9	12.8	2.9	
7-----	15.2	48.9	7.4	19.3	2.9	
8-----	43.3	69.6	30.1	53.8	23.3	
9-----	96.8	63.2	61.2	49.3	47.7	
10-----	155.7	49.0	76.3	13.8	21.5	
11-----	230.8	31.5	72.7	2.4	5.5	
12-----	51.5	100.0	51.5	26.8	13.8	
13-----	67.3	56.7	38.2	24.5	16.5	
14-----	144.2	72.3	104.3	21.6	31.1	
15-----	74.7	64.0	47.8	19.7	14.7	
16-----	82.5	72.0	59.4	44.0	36.3	
17-----	160.6	65.3	104.9	35.1	56.4	
18-----	35.9	67.2	24.1	27.0	9.7	
19-----	192.2	58.7	112.8	36.5	70.2	
20-----	119.2	84.1	100.5	29.6	35.4	
21-----	50.6	94.6	47.9	56.6	28.6	
22-----	48.9	92.2	45.1	68.9	33.7	
23-----	56.2	32.2	18.1	5.4	3.0	

^{1/} Derived from survey data.

^{2/} Complete fencing and livestock water available.

It is possible, however, that many farmers could and would shift their set-aside acreage to fields that are fenced and accessible to water if year-round grazing were anticipated. Thus, the absence of these facilities may not be as restrictive as the 1972 survey data indicate.

EFFECTS OF ALTERNATIVE SET-ASIDE PROVISIONS

Of all the factors affecting use of set-aside land to produce feeder cattle, none is more important than the expectations of producers concerning the relative profitability of cow-calf enterprises in the future. The slow rise in the supply of feeder cattle in recent years appears to have resulted largely from the relatively low feeder calf prices--generally \$30 or less per hundredweight--that prevailed during the 1960's. With prices at these levels, beef cow herds could not compete economically with other cropland-using enterprises in most parts of the country. Consequently, feeder cattle production was confined largely to land unsuitable for mechanized crop production. Under these conditions, production of feeder cattle expanded more slowly than the feedlot demand for cattle, which was met, to an increasing extent, by utilizing what might be termed "surplus" cattle--those that had formerly been slaughtered as veal or grass-fat beef. By 1970, however, the surplus had been absorbed, and it had become increasingly evident that feeder calf prices were rising to new higher levels that would make cattle raising competitive for some resources that were being used for other enterprises.

Expansion Plans of Sample Producers

Farmers who were interviewed in November and December 1972 were asked how many beef cows they owned at the time of the interviews. Before any reference was made to possible changes in grazing provisions of the set-aside program, they were asked how many beef cows they planned to have 3 years hence. They were then asked to estimate how many beef cows they would have in 3 years if they were (1) allowed to graze set-aside land year-round for the next 3 years, (2) allowed to graze year-round and harvest hay from set-aside land for the next 3 years, and (3) assured of the privilege of year-round grazing or hay harvesting from set-aside land for the next 10 years. No mention was made of possible changes from 1972 levels in either set-aside payment rates per acre or set-aside acreages. Since the interviews were conducted before 1973 program changes were announced, 1972 acreage requirements and payment provisions were evidently the basis used by the farmers in estimating changes in beef cow numbers.

Farmers indicated strong optimism regarding the relative profitability of feeder cattle production over the next 3 years. With no change from 1972 set-aside provisions, producers planned to increase beef cow numbers over the next 3 years by amounts ranging from 13 percent in subregion 21 to 46 percent in subregion 4 (table 11). Increases of more than 30 percent were planned by producers in nine of the 23 subregions. Weighted by present (November or December 1972) cow numbers, the expansion planned by all producers surveyed averaged slightly under 24 percent over the next 3 years, or about 7.4 percent annually.

Producer response to a 3-year option to graze set-aside land year-round was positive in each subregion. Estimated additional increases in beef cow numbers within 3 years varied widely, however, ranging from 2.2 percent of 1972

Table 11.--Present beef cow numbers on survey farms and expected percentage changes in 3 years with alternative restrictions on use of set-aside land, by subregions, 1972^{1/}

Subregion	Beef cow numbers in 1972	Percentage increase in beef cow numbers ^{2/}			
		7 month ^{3/} grazing	for 3 years	:Year-round :	
				: Year-round:grazing and hay	: Year-round grazing and hay for 10
	Cows	Percent	Percent	Percent	Percent
1-----	1,316	16.0	59.5	80.7	110.9
2-----	1,438	45.1	57.4	60.4	62.5
3-----	1,531	22.3	47.1	53.8	57.7
4-----	1,052	46.1	77.2	83.1	104.6
5-----	1,030	32.1	48.3	63.8	73.0
6-----	2,000	28.2	55.6	63.8	65.9
7-----	1,823	38.7	50.5	52.9	57.6
8-----	2,005	40.0	45.2	54.9	72.8
9-----	8,675	21.1	35.2	36.2	45.1
10-----	2,509	17.2	26.9	31.1	39.3
11-----	2,985	31.5	33.7	35.3	37.5
12-----	4,880	17.9	22.5	24.6	29.1
13-----	4,350	19.4	26.0	28.7	38.1
14-----	3,880	22.4	26.5	33.0	39.7
15-----	3,186	13.9	18.8	24.1	27.1
16-----	1,579	44.1	85.6	88.8	100.2
17-----	4,073	17.2	22.2	25.0	31.9
18-----	2,090	23.3	38.9	42.0	56.4
19-----	3,405	17.5	82.0	85.3	120.0
20-----	2,899	30.5	70.0	91.2	115.4
21-----	4,243	13.4	42.8	46.4	60.2
22-----	3,311	23.4	39.7	42.4	45.2
23-----	2,327	37.3	59.3	60.6	72.5
:					
Weighted Ave.		23.9	41.4	46.1	56.5

^{1/} Derived from survey data.

^{2/} Change expressed as a percent of 1972 beef cow numbers.

^{3/} Provisions identical to the 1972 set-aside programs.

^{4/} Change expected in 3 years if option to graze year-round and harvest hay were assured for 10 years.

numbers in subregion 11 to 64.5 percent in subregion 19 (table 11). In general, estimated response tended to be smallest in subregions in which summer fallowing is most beneficial to subsequent crop yields.

The prospect of being able to harvest hay from set-aside land as well as graze it year-round resulted in rather small additional increases in anticipated beef cow numbers in most subregions (table 11). Only producers in subregions 1, 5, and 20 indicated that their cow herds 3 years hence would be as much as 10 percentage points larger with a 3-year hay and graze option than with year-round grazing alone.

The possibility of having 10 years rather than 3 to recover investments that might be incurred in utilizing set-aside land for grazing also elicited widely different responses among farm operators surveyed in the various subregions. Added increases of 20 percentage points or more in beef cow numbers were estimated by farmers in subregions 1, 4, 19, and 20. By contrast, farmers in eight other subregions indicated that they would add fewer than 5 percent more cows within 3 years if they were assured of using set-aside land for year-round grazing and hay over a 10-year period rather than a 3-year period (table 11).

The changes in average herd sizes that would result if producers respond according to their specified anticipations are shown in table 12. The survey respondents in eight subregions averaged 40 or fewer cows in 1972. Many of the herds in these subregions are presently part-time or sideline operations. Even with grazing of set-aside land restricted to 7 months per year, as in 1972, producers in all but three subregions planned to have more than 40 cows on the average within 3 years. With the 10-year grazing and hay harvesting option, the anticipated average herd size would be fewer than 40 cows only in subregion 5, the central cash grain area of the Corn Belt. By contrast, producers in eight subregions expect to have herds that average 100 cows or more. Under these conditions, feeder cattle production would be a major enterprise on many of the survey farms in virtually every subregion included in this study.

Forage Availability on Sample Farms

An attempt was made during the field survey to identify the resource that most strongly constrained feeder cattle expansion on the farm of each producer interviewed and to determine the maximum number of beef cows that could be maintained on each farm with current resource situations. Each farmer was asked how many cows he could handle with his presently available supply of a specified resource if all other resources were readily available in unlimited quantities. The question listed each of the following in turn as the limiting resource, assuming unlimited quantities of all other resources: (1) Labor, (2) cattle shelter, (3) forage harvesting equipment, (4) hay production, (5) hay storage facilities, (6) silage storage facilities, (7) pasture, and (8) capital for the purchase of additional cows.

Answers to these questions indicated that many of the farm operators were unable or unwilling to identify a single most limiting resource. Most operators listed two or more resources as equally limiting.

Table 12.--Average beef cow numbers on survey farms and expected numbers per farm in 3 years with alternative restrictions on use of set-aside land, by subregions, 1972^{1/}

Subregion	Beef cows per farm in 3 years				
	Beef cows per farm in 1972	7-month ^{2/} grazing	:Year-round:		
			Year-round: grazing for 3 years	:grazing and hay :for 3 :years	Year-round grazing and hay for 10 years ^{3/}
	Cows	Cows	Cows	Cows	Cows
1-----	26.3	30.5	42.0	47.6	55.5
2-----	28.8	41.7	45.3	46.1	46.7
3-----	61.2	74.9	90.1	94.2	96.6
4-----	21.0	30.7	37.3	38.5	43.1
5-----	20.6	27.2	30.6	33.7	35.6
6-----	40.0	51.3	62.2	65.5	66.4
7-----	36.5	50.6	54.9	55.7	57.5
8-----	40.1	56.1	58.2	62.1	69.3
9-----	173.5	210.1	234.6	236.3	251.7
10-----	49.2	57.7	62.4	64.5	68.5
11-----	59.7	78.5	79.8	80.8	82.1
12-----	101.7	119.9	124.5	126.7	131.2
13-----	92.6	110.6	116.6	119.1	127.9
14-----	77.6	95.0	98.2	103.2	108.4
15-----	72.4	82.5	86.0	89.8	92.0
16-----	31.6	45.5	58.6	59.7	63.3
17-----	81.5	95.5	99.5	101.8	107.4
18-----	41.8	51.5	58.0	59.4	65.4
19-----	56.8	66.7	103.4	105.3	124.9
20-----	46.8	61.1	79.6	89.5	100.8
21-----	70.7	80.2	101.0	103.5	113.3
22-----	55.2	68.1	77.1	78.6	80.2
23-----	38.8	53.3	61.8	62.3	66.9
:					
Weighted ave.	57.1	70.7	80.7	83.4	89.3

^{1/}Derived from survey data.

^{2/}Provisions identical to the 1972 set-aside programs.

^{3/}Change expected in 3 years if option to graze year-round and harvest hay were assured for 10 years.

Of the resources listed above, only pasture and hay production are included in this report, as these are the feeder cattle production resources most directly related to alternative uses of set-aside land. The proportions of farmers in the various subregions who listed present pasture production as the single factor most effectively limiting expansion of their beef cow herds ranged from less than 10 percent to 44 percent of all farmers interviewed in each subregion. Thus, most producers were not utilizing their pastures at what they considered to be capacity.

In the aggregate, there was considerably more pasture capacity in most of the subregions in 1972 than was needed to support the beef cow inventories. At the extreme, producers in subregion 4 estimated that nearly four times as many beef cows as they owned in 1972 could be maintained on their present pasture acreages (table 13). In two-thirds of the subregions, pasture capacity was estimated to be adequate to accommodate expansions in beef cow numbers planned within the next 3 years, assuming 1972 set-aside provisions (tables 11 and 13).

However, other types of livestock, such as beef yearlings, are currently being grazed on some of the pasture not needed for beef cows. Consequently, unknown proportions of this pasture acreage would be available for expanded beef cow numbers only if beef cows were substituted for other types of livestock.

On the average, the farmers interviewed in 22 of the 23 subregions said that they produced more hay than was needed for beef cows that they had in 1972 (table 13). A number of southern and southwestern producers indicated that they would continue to buy the hay needed to supplement their pasture production and thus did not consider hay production on their farms a relevant constraint to the expansion of cattle raising.

FEEDER CATTLE PRODUCTION ON SET-ASIDE LAND

Estimated Costs and Returns

In every subregion, farmers who were interviewed indicated that they would increase beef cow numbers in response to each of the increasingly more liberal options concerning use of set-aside land. The size of the increases, however, was no doubt affected by the anticipated profitability of cattle raising compared with other potential uses of the set-aside land. Anticipated relative profitability, in turn, was almost certainly influenced by the high and rising feeder cattle prices that prevailed during 1972.

Cost-and-returns budgets for beef cow-calf enterprises in each study subregion were estimated as an aid in analyzing the varying conditions under which cow herd expansions would be profitable, using set-aside land in different regions of the country.

Budgeting Procedure and Assumptions. Two sets of budgets were prepared. The first set simulated costs and returns of expanding beef cow herds when the only relevant costs were expenditures to prepare set-aside land for pasture and hay production and to cover cash costs of the additional cattle. Other resources such as labor and buildings needed for feed storage or cattle shelter

Table 13.--Number and percentages of beef cows that could be handled on survey farms with present pasture and hay production if other resources were not limiting, by subregions, 1972^{1/}

Subregion	Present pasture			Present hay production		
	Beef cows			Beef cows		
	in 1972	Maximum capacity ^{2/}		in 1972	Maximum capacity ^{2/}	
	on farms	Beef	Percent	on farms	Beef	Percent
	reporting ^{2/}	cows	of 1972	reporting ^{2/}	cows	of 1972
	Cows	Cows	Percent	Cows	Cows	Percent
1-----:	1,299	1,742	134	1,080	1,928	178
2-----:	1,048	1,477	141	627	1,192	190
3-----:	1,531	2,634	172	1,381	2,076	150
4-----:	1,035	3,984	385	870	1,726	198
5-----:	977	1,348	138	1,028	1,463	142
6-----:	1,660	2,405	145	1,901	2,999	158
7-----:	1,776	2,621	148	1,823	2,664	146
8-----:	2,005	2,215	110	2,005	3,165	158
9-----:	8,675	14,810	171	8,675	13,470	155
10-----:	2,509	3,182	127	2,509	3,070	122
11-----:	2,985	4,165	140	2,985	4,875	163
12-----:	4,442	4,665	105	3,960	4,201	106
13-----:	4,350	5,424	144	4,350	6,798	156
14-----:	3,774	4,512	120	3,774	4,156	110
15-----:	2,743	4,038	147	2,803	2,354	84
16-----:	1,579	1,946	123	1,506	2,467	164
17-----:	4,073	4,848	119	4,073	6,766	166
18-----:	2,090	2,426	116	2,090	2,797	134
19-----:	3,405	5,664	166	570	1,200	210
20-----:	2,889	3,903	135	2,311	3,552	154
21-----:	4,243	4,674	110	3,326	3,667	110
22-----:	3,311	4,502	136	1,998	3,028	152
23-----:	2,327	3,891	167	2,254	3,656	162

^{1/}Derived from survey data.

^{2/}Includes only farms for which quantitative capacity estimates were provided.

were assumed to be available at no added costs on a short-term basis. Excess resources exist on some farms that now have beef cow herds, judging from the survey data concerning maximum cow numbers that could be handled with resources currently available. Even with relatively low cattle prices, the option to graze year-round or harvest hay from set-aside land might provide the necessary incentive to expand beef cow herds on such farms.

The second set of budgets was used to estimate the cattle prices required to make feeder cattle production profitable in a long-term framework. All costs of production except real estate taxes and interest on investment in land would need to be covered. Year-round grazing and hay harvesting from set-aside land was assumed to be permitted for a 10-year period. Thus, 10 years was the maximum period assumed for amortizing additional investments required to expand the cow-calf enterprise.

Budgets for the short- and long-term situations were prepared by the individual researcher most familiar with cattle raising and resource conditions in each subregion. Some assumptions, such as the length of the normal grazing season, the type of forage plants likely to be used for grazing or hay in a short-run or long-run cattle expansion plan, and the cultural practices and productivities associated with these species, naturally varied from one subregion to another. The general approach used in estimating the budgets for each subregion, however, was similar. Nutritional requirements per brood cow unit--mature cow and associated calves, replacement heifers, herd bulls, and others--were estimated on a seasonal basis from available secondary data. Availability of cattle feed from the applicable forage species was also based on local data concerning animal carrying capacities. Each brood cow unit was allocated the acreage necessary to supply all its feed requirements during the grazing period when the pasture was least productive. Hay for the nongrazing season was assumed to be harvested from nurse crops used in establishing pasture sods, from excess growth of pasture plants during the peak growing season, or from forages maintained specifically for hay on set-aside acreage in addition to that used for pasture.

Revenue credited to the cattle-raising enterprise originated from the annual sale of weaned calves and cull breeding animals. Calf weaning rates, brood cow culling rates, and average sale weights of calves and cull cows varied among subregions to reflect the size and type of beef cattle normally kept and the husbandry practices of good farm managers in the area. Revenue in each subregion was estimated at calf prices ranging from \$25 to \$45 per hundredweight in \$5 increments. Cull cow prices were assumed to be \$16 per hundredweight when the calf price was \$25 and to increase by \$3 per hundredweight with each \$5 increment in the calf price.

Budgeted input quantities and costs per cow unit also varied among subregions because of differences in such things as types, amounts, productivities, and unit production costs of forages used for grazing and hay. However, the types of cost items were similar in all subregions. Short-run costs included direct production costs (seed, fertilizer, and others) for pasture and hay; fencing costs; costs of protein and grain supplemental feeds; cash expenditures for marketing fees, veterinary services, and medical supplies; breeding costs (or bull depreciation); costs of fuel and power attributable directly to the cattle enterprise; and interest on operating capital and investment in

livestock (the added brood cow and her proportionate share of replacement animals). An additional charge levied against feeder cattle produced on set-aside land was the estimated net value of 1972 uses of set-aside acreage. This included the value of forage grazed during the 7 months when grazing was permitted in 1972 and the increased value or lower production costs of crops grown following summer fallow on set-aside land or of skip-row cotton where the vacant rows constituted set-aside acreage.

In the long-run budgets, these same cost items plus depreciation and interest on buildings and equipment used in the cattle enterprise, the cost of labor, and a share of general farm overhead costs were included in long-run costs.

Short-Term Budget Results. With average prices as low as \$25 per hundredweight for feeder calves and \$16 for cull cows, producers in only two subregions could profitably produce feeder cattle on set-aside land with year-round grazing or hay harvesting over a 3-year period (table 14). However, if feeder calf and cull cow prices averaged \$30 and \$19 per hundredweight, respectively, producers in more than half of the study subregions might increase their net incomes by developing and using forage on their set-aside land to expand cattle production (fig. 3). They could afford to expand production if: (1) They had excess supplies of all relevant resources except pasture, hay, and cattle, (2) they could obtain additional productive brood cows without delay, (3) set-aside payment rates were not reduced as a condition to permitting year-round grazing and hay harvesting from set-aside land, and (4) the programs permitting year-round forage utilization and prohibiting production of other crops on set-aside land could be expected to last at least 3 years.

By contrast, producers in five of the study subregions would be unable to cover direct feeder calf production costs on set-aside land at a price of \$40 per hundredweight for calves, and in subregions 11 and 14 an average calf price in excess of \$45 would be necessary to cover direct costs as defined here (table 14). Two major factors are largely responsible for the higher breakeven cattle prices in these subregions. First, income given up by shifting set-aside land from the fallow-small grain rotation is greater than potential returns from the production of forage for additional beef cows, because large acreages of set-aside land are necessary to provide the pasture and hay required per brood cow unit in these drier subregions. Second, a full year (2 years in subregions 12 and 13) is required to establish a productive sod of pasture and hay grasses in the subregions with more limited precipitation. Consequently, at the most, only two calf crops could be produced and sold during the 3-year period assumed for the short-term budgets, with no income to offset costs until the second or third year.

Cash Flow Example. A shortage of revenue from cattle sales during the first few years following cow herd expansion would be a more serious problem in all subregions if producers chose, or were forced, to expand their cow herds by retaining additional heifers rather than by purchasing mature cows, as assumed in the budgets. The cash flow constraints are indicated in table 15, which was estimated specifically for subregion 4 but illustrates problems that would be faced by producers in any subregion.

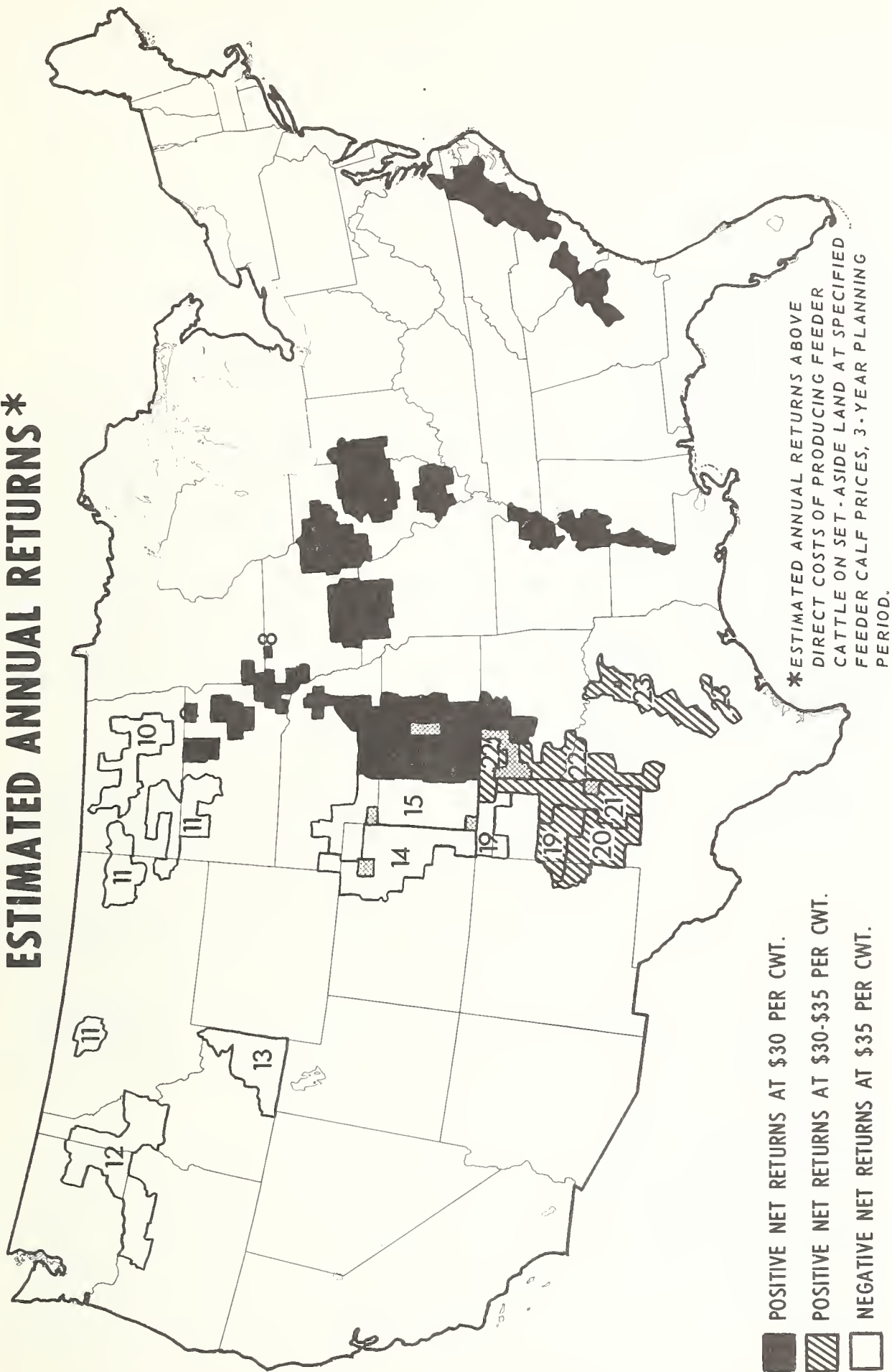
Table 14.--Estimated annual returns above direct costs per brood cow unit from producing feeder calves on set-aside land at specified cattle prices^{1/} with year-round grazing and hay harvesting for 3 years, by subregions^{2/}

Subregion	Calf price per hundredweight ^{2/}				
	\$25	\$30	\$35	\$40	\$45
1-----	-\$16.55	\$2.62	\$21.89	\$41.16	\$60.43
2-----	-7.54	14.61	36.76	58.91	81.06
3-----	5.26	23.36	41.46	59.56	77.66
4-----	-2.31	18.70	39.70	60.71	81.71
5-----	-4.71	15.61	35.92	56.23	76.54
6-----	-5.44	15.34	36.13	56.92	77.70
7-----	-12.31	7.38	27.07	46.77	66.46
8-----	3.47	15.22	26.96	38.70	50.45
9-----	-3.04	8.42	19.84	31.30	42.72
10-----	-44.76	-31.77	-18.82	-5.84	7.11
11-----	-62.46	-49.50	-36.54	-23.58	-10.62
12-----	-21.86	-14.45	-7.03	.38	7.79
13-----	-26.45	-19.05	-11.66	-4.27	3.13
14-----	-76.19	-58.34	-40.61	-22.88	-5.03
15-----	-70.27	-51.58	-32.88	-14.19	4.51
16-----	-4.38	15.35	34.67	53.99	73.30
17-----	-18.26	1.47	20.79	40.11	59.43
18-----	-17.28	5.45	27.76	50.08	72.39
19-----	-45.10	-22.99	-.87	21.24	43.35
20-----	-38.13	-16.02	6.10	28.21	50.32
21-----	-23.17	-1.06	21.06	43.17	65.28
22-----	-43.16	-21.05	1.07	23.18	45.29
23-----	-32.18	-10.07	12.05	34.16	56.27

^{1/} Labor, buildings, and equipment are assumed to be available in sufficient quantities to handle any cow herd expansion during the 3-year period. Thus, direct cost estimates do not include the cost of labor, or depreciation and interest on buildings and equipment. Value of 1972 uses of set-aside land is charged as a cost to the added beef cow units. Landownership costs are not included.

^{2/} For calf prices of \$25, \$30, \$35, \$40, and \$45 per hundredweight, corresponding cull cow prices are assumed to be \$16, \$19, \$22, \$25, and \$28 per hundredweight, respectively.

ESTIMATED ANNUAL RETURNS*



U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 312-73 (9) ECONOMIC RESEARCH SERVICE

Figure 3

Table 15.--Estimated 3-year impact on cash flow per cow unit increase in herd size through retention of heifer calves, subregion 4

Item 1/	First year	Second year	Third year
Gross income:			
Heifers saved-----	1.5 @ 444 lb. x \$35/cwt. = -\$233.10	none 0	none 0
Calves sold-----	none 0	.9 @ 444 lb. x \$35/cwt. = \$139.86	.9 @ 444 lb. x \$35/cwt. = \$139.86
Cull yearlings sold---	.47 @ 650 lb. x \$30/cwt. = 91.65	none 0	none 0
Death loss-----	reflected in culls 0	2% -4.80	2% -6.00
Marketing cost-----	-2.00	-4.00	-4.00
Total-----	-\$143.45	\$131.06	\$129.86
Direct costs:			
Grain, protein, minerals-----	\$35.04	\$7.83	\$11.68
Hay harvest-----	13.35	22.14	22.14
Breeding-----	4.80	4.80	4.80
Vet-medical-----	3.00	2.00	2.00
Power, fuel, repairs--	7.50	5.00	5.00
Temporary fence-----	24.00	0	0
Forage establishment--	14.08	0	7.04
Forage maintenance---	4.77	7.95	7.95
Other-----	1.50	1.00	1.00
Total working capital-----	\$108.04	\$50.72	\$61.61
Interest on working capital-----	7.56	3.55	4.31
Interest on livestock---	15.75	16.80	21.00
Value of foregone grazing 2/-----	2.80	2.80	2.80
Total direct costs--	\$134.15	\$73.87	\$89.72
Net cash balance/yr.--	-\$277.60	\$57.19	\$40.14
Net cash balance--3 yrs.-----			-\$180.27

1/ Average costs developed per cow unit were adjusted on a percentage basis according to the heifer calf growth plan "A": Developed by D. L. Seigenthaler, "Capital Investment and Recovery of Investment in Beef Cow Enterprises in the Corn Belt," unpublished M.S. thesis, Illinois, 1972. Exceptions are costs of developing set-aside acres which are charged in first year. Net worth at end of third year is increased by a \$300 cow. Replacements commence in fourth year.

2/ Estimated value of grazing actually utilized from 3.2 acres of set-aside land in 1972.

At a calf price of \$35 per hundredweight, current year sales receipts are reduced by \$155 for each additional heifer calf retained for herd expansion (table 15). The direct costs of maintaining the heifer for a year plus all of the costs of preparing set-aside land for forage production are incurred during the first year, but there is little offsetting income until near the end of the second year. As a result, cash income during the first year is reduced by about \$278 per additional cow unit. The second and third years show a positive net cash flow, but the aggregate for the 3-year period leaves the producer with a net cash deficit of \$180 per added cow unit, even with no charge for labor, facilities, or land ownership. Offsetting this deficit cash position is an inventory increase of perhaps \$300 for the cow plus some improvements in growing crops. It seems likely that producers will undertake such expansion only if they are confident that cattle prices will remain relatively favorable for more than 3 years or if they expect set-aside program provisions to allow full utilization of the forage improvements for more than 3 years.

Long-Term Budget Results. Labor, buildings, and equipment sufficient to accommodate additional brood cows may be available at little or no added cost for a few years on many farms. Over some longer period, however, the additional cows should be expected to pay for all resources which they require at competitive market rates. The average calf prices needed to justify shifting set-aside land from 1972 uses to forage for expanded brood cow herds when all cattle-raising costs must be paid are illustrated in table 16. These estimates correspond rather closely with the price levels suggested by beef industry leaders in 1970 as necessary to promote strong expansion in beef cow numbers. ^{5/} In four of the nine remaining subregions, where fallowing is especially profitable, calf prices in excess of \$50 per hundredweight would be necessary to make feeder calf production competitive with 1972 uses of set-aside land.

Regional Estimates of Increases in Beef Cow Numbers

Cow herd expansion plans of the sample producers and the cost-and-returns budgets discussed in the previous section provided two different partial bases from which to estimate regional changes in beef cow numbers that might be expected to occur with alternative provisions concerning use of set-aside land. ^{6/} This information plus available inventory data and the general knowledge of the researchers most familiar with feeder cattle production in each region were used in arriving at the judgment estimates summarized below.

South. ^{7/} Farmers surveyed in the three study subregions in the South indicated that within 3 years they plan to have 28 percent more beef cows on the average than they owned at the time of the survey, assuming continuation of

^{5/} R. N. Van Arsdall and M. D. Skold, "Cattle Raising in the United States," U. S. Department of Agriculture, Agricultural Economic Report 235, January 1973, pp. 66-67.

^{6/} Subregional expansions of the sample survey results are discussed in the appendix.

^{7/} The South, as used in this report, includes the Appalachian region States of Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; South Carolina, Georgia, Florida, and Alabama from the Southeast region; and the Delta States of Mississippi, Arkansas, and Louisiana.

Table 16.--Estimated annual returns above all costs per brood cow unit from producing feeder calves on set-aside land at specified cattle prices,^{1/} with year-round grazing and hay harvesting for 10 years, by subregions^{2/}

Subregion	Calf price per hundredweight ^{2/}				
	\$25	\$30	\$35	\$40	\$45
1-----	-\$39.32	-\$20.05	-\$0.78	\$18.49	\$37.76
2-----	-25.92	-11.35	3.22	17.80	33.37
3-----	-21.48	-3.38	14.72	32.82	50.92
4-----	-52.51	-31.50	-10.50	10.51	31.51
5-----	-54.91	-34.59	-14.28	6.03	26.34
6-----	-55.64	-34.86	-14.07	6.72	27.50
7-----	-62.51	-42.82	-23.15	-3.43	16.26
8-----	-43.04	-25.54	-8.05	9.45	26.95
9-----	-53.36	-35.86	-18.37	.87	16.63
10-----	-94.09	-76.59	-59.10	-41.60	-24.10
11-----	-112.42	-94.92	-77.43	-59.93	-42.43
12-----	-41.78	-23.99	-6.20	11.59	29.38
13-----	-69.48	-51.68	-33.89	-16.10	1.68
14-----	-171.90	-154.06	-136.31	-118.57	-100.82
15-----	-168.34	-149.64	-118.84	-112.32	-93.61
16-----	-43.09	-23.36	-4.04	15.28	34.59
17-----	-63.56	-43.83	-24.51	-5.19	14.13
18-----	-57.74	-35.01	-12.70	9.62	31.93
19-----	-92.12	-70.01	-47.89	-25.78	-3.67
20-----	-85.15	-63.04	-40.92	-18.81	3.30
21-----	-70.19	-48.08	-25.96	-3.85	18.26
22-----	-90.18	-68.07	-45.95	-23.84	-1.73
23-----	-69.41	-47.30	-25.18	-3.07	19.04

^{1/} Value of 1972 uses of set-aside land is charged as a cost to the added beef cow units. Land ownership costs are not included.

^{2/} For calf prices of \$25, \$30, \$35, \$40, and \$45 per hundredweight corresponding cull cow prices are assumed to be \$16, \$19, \$22, \$25 and \$28 per hundredweight, respectively.

programs which prohibit grazing on set-aside land during the 5 principal growing months. This would require three successive annual increases of about 8.5 percent each, which appears quite possible within the three subregions, all of which have fewer beef cows per acre of cropland than the South as a whole. For the entire region, however, it is estimated that expansion would amount to about 6.5 percent annually, given 1972 set-aside provisions. This would result in a regional increase of almost 2.1 million beef cows over the next 3 years (table 17). By comparison, increases of about 0.5 million beef cows per year, or about 5.4 percent annually, occurred during 1971 and 1972. 8/

Additional expansions would occur in response to the more liberal assumptions concerning use of set-aside land. To estimate regional totals, the survey results for subregions 1, 2, and 3 combined were assumed to apply to all set-aside acreage on farms with beef cows in the South. 9/

If year-round grazing of set-aside land were permitted for the next 3 years, the regional inventory of beef cows would increase by an estimated 0.5 million head more than with set-aside grazing limited to 7 months annually. A 10-year option to graze year-round or harvest hay from set-aside land would result in an estimated regional increase of 3.0 million beef cows within 3 years--0.9 million more than with 7-month grazing (table 17).

Northeast. In the 11 States north of the Virginias and east of Ohio, there were only about 782,000 acres of set-aside land in 1972. Most of this was located in Maryland, Pennsylvania, and New York. Data from the June Enumerative Survey of the Statistical Reporting Service (SRS) indicate that 20 percent of this acreage was on farms with beef cows. However, milk cows, which outnumber beef cows in the region by about five to one, would probably be used to take advantage of more liberal forage utilization options on much of the set-aside acreage. The estimates of increases in beef cow numbers within the next 3 years, shown in table 17, are thus based on recent SRS cow inventory data and the assumption that 20 percent of the total set-aside acreage would be used for beef cow expansion at half the rate per acre estimated for the South under each program option which would permit year-round forage utilization.

Corn Belt-Lake States. 10/ Beef cows in the Corn Belt and Lake States probably would increase by about 1.7 million head within 3 years under a continuation of 1972 set-aside provisions (table 17). Such an increase would occur if all farmers in the region who had both set-aside acreage and beef cows in 1972 expanded their herds at the average rate indicated by producers who

8/ Statistical Reporting Service, "Cattle," LVGN 1(173), U. S. Dept. Agr., February 1973.

9/ See appendix table 3.

10/ Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin, Michigan, and Minnesota.

Table 17.--1973 inventories and estimated increases in beef cows in the United States within 3 years under alternative restrictions on the use of set-aside land, by regions^{1/}

Region	:	:	Permitted use of set-aside land						
			:	Year- round	:	Year-round grazing and hay	:	Year-round grazing and hay	
January 1, 1973	2/	7-month grazing	for 3 years	for 3 years	for 10 years				
1,000 cows-----1,000-cow increase -----									
South ^{3/}	:	10,009	2,081	2,590	2,780	3,000			
Northeast ^{4/}	:	375	35	50	56	63			
Corn Belt-	:								
Lake States ^{5/}	:	6,918	1,744	2,741	3,074	3,443			
Northern Plains ^{6/}	:	10,767	1,941	2,116	2,179	2,363			
Southern Plains ^{7/}	:	9,283	479	1,168	1,254	1,600			
Northwest ^{8/}	:	2,634	284	312	315	405			

United States ^{9/}	:	39,986	6,564	8,977	9,658	10,874			
:									
:									

^{1/} Assuming the acreage and regional distribution of set-aside land that existed in 1972.

^{2/} Statistical Reporting Service, "Cattle," LvGn 1 (173), U. S. Dept. Agr., February 1973.

^{3/} Virginia, West Virginia, North Carolina, Kentucky, Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, and Louisiana.

^{4/} Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

^{5/} Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin, Michigan, and Minnesota.

^{6/} North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming, and Montana.

^{7/} Oklahoma, Texas, and New Mexico.

^{8/} Idaho, Washington, Oregon, and California.

^{9/} Excludes Arizona, Utah, and Nevada as well as Alaska and Hawaii. The beef cow inventory in these States was 1.116 million head on January 1, 1973. In 1972, however, these States contained only about 265,000 acres of set-aside land, less than half of which was estimated to be on farms with beef cows. Thus, alternative set-aside provisions would probably have little effect on changes in beef cow numbers.

were interviewed in subregions 4 through 7. 11/ Three successive annual increases amounting to 8 percent of the regional inventory of beef cows would provide an expansion of this magnitude.

An estimated 2.7 million beef cows would be added on Corn Belt-Lake States farms within 3 years if year-round grazing of set-aside acreage were permitted throughout this period. The increase in beef cow numbers within 3 years would be nearly twice as large with a 10-year option to graze or harvest hay from set-aside land at any time during the year as with set-aside grazing restricted to 7 months annually (table 17).

Northern Plains. 12/ Results of the cost-and-returns budget analyses, shown in tables 14 and 16, indicated that it would not pay to shift set-aside land in the western portion of the region from summer fallow to production of forage for beef cows. Consequently, response to year-round haying or grazing options on set-aside land would probably occur only in the eastern parts of South Dakota, Nebraska, and Kansas. The total regional increase in beef cow numbers within the next 3 years would amount to about 1.9 million under a continuation of 1972 set-aside provisions (table 17). Most of this expansion, which amounts to about 5 percent annually, would be likely to result from more intensive use of current forage sources; not set-aside acreage. Even with year-round utilization of forage from set-aside land assured for 10 years, an additional increase of only 0.4 million cows would be expected within 3 years.

Southern Plains. 13/ The budget analyses indicated that shifting set-aside land from 1972 uses to more intensive forage production for beef cows in the Southern Plains would be profitable only if some resources, such as livestock facilities, were available at less than their assumed full market values. In fact, many farmers in this region have traditionally operated cow-yearling or stocker cattle production programs and do have more equipment and facilities than are needed for present beef cow herds. Thus, the survey results in intended increases in cow numbers per 100 acres of set-aside land on survey farms in subregions 18-23 were assumed to apply to the total regional acreage of set-aside land in 1972 on farms with beef cows to derive the estimates shown in table 17.

11/ This estimate does not include possible increases in beef cow numbers by farm operators who were not enrolled in one of the set-aside programs in 1972 nor by those who were enrolled but who owned no beef cows in 1972. Such omissions, however, are probably minor. Enrolled farmers operated more than 80 percent of all cropland in the region on which there was a feed grain or wheat base in 1972. Thus, nonparticipating farmers apparently controlled only a small share of the more productive land resources. Also, it appears doubtful that many farmers who did not own beef cows in 1972 would make the large investments required to start a herd within the next 3 years, especially if crop prices remained relatively favorable.

12/ As used here, the Northern Plains includes the Mountain States of Montana, Wyoming, and Colorado in addition to North Dakota, South Dakota, Nebraska, and Kansas.

13/ Oklahoma, Texas, and New Mexico.

Less than 0.5 million cows would probably be added in the region in 3 years with a continuation of 1972 provisions concerning forage utilization on set-aside land. This is an indication that much of the forage potentially available during the nonsummer months is now being utilized primarily by stocker cattle and would not be shifted to brood cows. With year-round grazing assured for 3 years, however, cow numbers would increase by 1.2 million; and if year-round grazing and hay harvesting privileges were guaranteed for 10 years, the aggregate increase within 3 years is estimated at 1.6 million beef cows (table 17). Three successive increases of about 5.5 percent per year would yield an expansion of this magnitude.

Northwest. ^{14/} Based on plans of the producers interviewed in subregions 12 and 13, a 3-year increase of less than 0.1 million beef cows would occur in the Northwest with grazing of set-aside land prohibited during the 5 principal growing months each year. A short-term option to graze or harvest hay from set-aside land throughout the year would result in very little additional forage production on set-aside acreage. Such an option, however, would probably promote more complete utilization of grassland areas that are surrounded by or intermingled with set-aside land, resulting in minor additional increases in cow numbers. Some set-aside land would be shifted to forage for beef cows if year-round utilization were assured for at least 10 years. Consequently, the total regional expansion in beef cows might increase to about 0.4 million head within 3 years (table 17).

United States. ^{15/} January 1, 1973, inventory estimates of the SRS Crop Reporting Board indicate that feeder cattle producers have started to respond to increasing cattle prices during the last 2 years. The national inventory of beef cows increased by 5.9 percent during 1972, compared with annual increases of 3.5 percent or less during the preceding 5 years. A major conclusion of this study is that accelerated expansion of the beef cow herd is likely to continue over the next 3 years.

Under set-aside provisions similar to those in effect in 1972, an increase of 6.6 million beef cows, or about 16 percent of the January 1, 1973, inventory, during the next 3 years is indicated (table 17). If year-round grazing of set-aside acreage were permitted over this period, it is estimated that the national inventory would increase by an additional 2.4 million beef cows. Adding an option to harvest hay from set-aside land would result in still another increase of 0.7 million cows. Assurance that forage developed on this land could be used for a 10-year period would result in a further addition of 1.2 million brood cows, or a total increase of 10.9 million head within 3 years (table 17). This amounts to a total increase of about 26.5 percent of the January 1, 1973, inventory within 3 years, or an accumulated average increase of about 8.2 percent per year.

^{14/} Idaho, Washington, Oregon, and California are included in the Northwest region as used in this report.

^{15/} Any changes in beef cow numbers that may occur in Arizona, Utah, and Nevada as well as Alaska and Hawaii are excluded from the national estimates (see table 17.)

Feeder Cattle Increases

During recent years, calves born annually have averaged about 90 percent of January 1 inventory numbers of cows and heifers 2 years old and over on U.S. farms. Annual cattle and calf death losses combined have amounted to about 8 percent of cow inventory numbers. ^{16/} Further, about 17 percent of the beef breeding herd is normally replaced each year. ^{17/}

Thus, if only enough heifers for normal herd replacements were retained by producers, increases in feeder calf numbers 3 years hence would be about 65 percent as great as the corresponding increases in number of beef cows (table 17). In other words, feeder cattle increases would range from 4.27 million head with set-aside grazing limited to 7 months during the year to 7.08 million head if year-round grazing and hay harvesting from set-aside land were assured for 10 years.

To continue expansion of the cow herd beyond the 3-year planning period, however, would necessitate the retention of at least one heifer per added cow, reducing the maximum potential increase in feeder cattle supplies. In fact, the retention of enough additional heifers to accomplish the accelerated cow herd expansion which occurred in 1972 no doubt contributed to the relatively tight current feeder cattle supply which has resulted in rising cattle prices.

Applicability of Estimates

The estimates discussed above apply under the specific conditions assumed in this study. Changes in any of several basic assumptions could affect the estimates significantly.

The total acreage of set-aside land is obviously a major determinant of changes in beef cow numbers in response to set-aside use provisions. For this report, a national total of about 59 million acres--comparable to the acreage enrolled in the feed grain, wheat, and cotton programs in 1972--was used, because this was believed to be the acreage implicitly assumed in the responses of the sample producers who were interviewed. To the extent that intensity of utilization of set-aside land for feeder cattle production is unrelated to the total acreage involved, however, a comparable set of estimates can be developed rather easily for any other specified acreage, if geographic distribution of this acreage can also be specified.

The estimates in table 17 illustrate the important effect that geographic distribution of set-aside land has on potential beef cow expansion. In 1972, the acreage of set-aside land in the Northern Plains (as defined in footnote 12) was approximately the same as the combined acreage in the Corn Belt-Lake States and the South. However, the estimated additional increase in beef cows with the long-term grazing and hay harvesting option, compared with 7-month grazing

^{16/} Economic Research Service, "Livestock and Meat Statistics," U.S. Dept. Agr., Supplement for 1970 to Statis. Bul. 333, 1971.

^{17/} R. N. Van Arsdall and M. D. Skold, "Cattle Raising in the United States," U.S. Dept. Agr., Agr. Econ. Rpt. 345, January 1973.

only, is more than six times as large in the latter two regions as in the Northern Plains.

Permitted uses of set-aside acreage will no doubt have a major effect on the feeder cattle expansion plans and performance of farmers. It was assumed in this study that no major crops other than forage grasses could be harvested from set-aside land, as was the case in 1972. Additional research would be required to adequately assess the effects on beef production if production of nonforage crops were also allowed. It is almost certain, however, that beef cow expansion would be curtailed under such provisions, especially if the prices of soybeans and other crops remained favorable.

Finally, the producer survey, which was a major basis for the estimates reported here, assumed no reduction in program payment rates for the privilege of year-round forage utilization on set-aside land. The extent to which this assumption might be relaxed is considered in the following section.

POTENTIAL CHANGES IN SET-ASIDE PROGRAM PAYMENT RATES

Results of the cost-and-returns budget analyses provide a basis for estimating changes in set-aside payment rates that might be acceptable by feeder cattle producers if they were allowed to make year-round use of forage produced on their set-aside land. ^{18/} Estimated annual returns minus direct costs of producing feeder calves on set-aside land are summarized in table 14. Similar estimates of returns minus total production costs are depicted in table 16. These estimates, expressed on a per acre basis, represent the maximum reductions in program payments per acre that cattle producers could accept in return for year-round grazing and hay harvesting privileges on set-aside land if net returns from program participation are to be maintained at 1972 rates per acre.

On farms that now have enough surplus labor, machinery, and buildings to expand feeder cattle production to the carrying capacity of their set-aside acreage, producers in the South, the Corn Belt-Lake States, and the eastern edge of the Northern Plains could break even by accepting payment reductions ranging from less than \$1.00 to \$15.57 per acre for the privilege of using their set-aside land year-round in the production of feeder cattle at an average calf price of \$30 per hundredweight (table 18). Because of the risks involved in feeder cattle production, however, it appears unlikely that cattle producers in any area other than perhaps the deep South would willingly accept any significant reduction in set-aside payments in order to expand cattle raising unless they expected calf prices to average about \$35 per hundredweight. Similarly, calf prices of \$45 or more per hundredweight would probably have to be anticipated before feeder calf producers in the western third of the Nation would be willing to accept set-aside payment reductions in exchange for year-round grazing and hay-harvesting privileges, even if only direct costs of cattle raising were considered relevant.

^{18/} As in the analysis of expansion in beef cow numbers under alternative set-aside use provisions, the assumption that no major crops other than forage grasses could be harvested from set-aside land is vital to the following discussion of possible payment rate changes.

Table 18.--Estimated annual returns per acre above direct and total costs of producing feeder cattle on set-aside land at specified cattle prices, by subregions^{1/}

Subregion	Estimated returns per acre over direct costs ^{2/} at calf price of-- ^{2/}				Estimated returns per acre over total costs ^{3/} at calf price of-- ^{3/}	
	\$30/cwt.	\$35/cwt.	\$40/cwt.	\$45/cwt.	\$40/cwt.	\$45/cwt.
	:	:	:	:	:	:
1-----	\$1.31	\$10.95	\$20.58	\$30.22	\$9.24	\$18.88
2-----	9.61	24.18	38.76	53.33	11.71	21.95
3-----	15.57	27.64	39.71	51.77	21.88	33.95
4-----	5.84	12.41	18.97	25.53	3.28	9.85
5-----	6.24	14.37	22.49	30.62	2.41	10.54
6-----	6.14	14.45	22.77	31.09	2.69	11.00
7-----	2.31	8.46	14.62	20.77	2.10	8.59
8-----	6.82	12.09	17.35	22.62	4.24	12.08
9-----	2.49	5.87	9.26	12.64	.26	4.92
10-----	-6.62	-3.92	-1.22	1.48	-8.67	-5.02
11-----	-7.33	-5.41	-3.49	-1.57	-8.88	-6.29
12-----	-3.82	-1.86	.10	2.06	3.07	7.77
13-----	-4.13	-2.53	-.93	.68	-3.49	.36
14-----	-5.10	-3.55	-2.00	-.44	-12.56	-10.68
15-----	-6.29	-4.01	-1.73	.55	-12.91	-10.76
16-----	5.69	12.84	20.00	27.15	5.66	12.81
17-----	.33	4.72	9.12	13.51	-1.18	3.21
18-----	1.82	9.25	16.69	24.13	3.21	10.64
19-----	-1.95	-.07	1.80	3.67	-2.18	-.31
20-----	-1.67	.64	2.94	5.24	-1.96	.34
21-----	-.14	2.70	5.53	8.37	-.49	2.34
22-----	-3.69	.19	4.07	7.95	-4.18	-.30
23-----	-2.19	2.62	7.43	12.23	-.67	4.14

^{1/}Positive numbers represent maximum reductions in set-aside payments per acre which would allow producers to obtain the same net income from feeder calf production on set-aside land as from 1972 uses of set-aside acreage.

^{2/}Estimates from table 14 divided by acreage of set-aside land assumed necessary to support one brood cow and support stock.

^{3/}Estimates from table 16 divided by acreage of set-aside land assumed necessary to support one brood cow and support stock.

When total cattle production costs are taken into account, a calf price of \$40 per hundredweight would justify substantial reductions in set-aside payments per acre in the South and nominal reductions in the Corn Belt-Lake States and bordering areas (table 18). On the other hand, a calf price in excess of \$45 would be required in the drier parts of the Northern and Southern Plains to encourage producers to accept a reduction in set-aside payment rates for the privilege of using set-aside acreage to expand their beef herds.

Although farmers with set-aside land but no beef cows would probably affect feeder cattle production only indirectly within 3 years, such farmers would have the opportunity to grow hay for sale on their set-aside land under the use options assumed in this study. They would also have an interest in, and be affected by, any reductions in set-aside payment rates. A cost-and-returns budget for hay production on set-aside land was estimated for each study subregion to analyze conditions under which payment reductions might be accepted in exchange for hay-harvesting privileges. Because most farmers with no beef cows probably do not own hay-harvesting equipment, custom harvesting at estimated present average rates was assumed in these budgets.

Cash grain farmers in the Corn Belt-Lake States and the eastern fringes of the Northern Plains could afford to accept small reductions in per acre payment rates if all hay produced on set-aside land could be sold for \$15 per ton to buyers who would haul it directly from the field at harvest time. A net price of \$20 to \$25 per ton at the field would be required, however, to offset significant set-aside payment reductions in other regions (table 19).

Table 19.--Estimated annual net returns per acre from producing hay for sale on set-aside land for 3 years at specified hay prices, by subregions^{1/}

Subregion	Hay price per ton ^{2/}			
	\$15	\$20	\$25	\$30
1-----	-\$36.04	-\$11.04	\$13.96	\$38.96
2-----	-37.31	-12.31	12.69	37.69
3-----	-18.07	11.93	41.93	71.93
4-----	2.77	13.77	24.77	35.77
5-----	4.10	16.60	29.10	41.60
6-----	4.96	19.11	32.26	47.41
7-----	2.67	12.97	23.27	35.37
8-----	14.04	29.04	44.04	59.04
9-----	4.33	14.18	24.03	33.88
10-----	-4.06	3.09	10.24	17.39
11-----	-4.88	1.27	7.42	13.57
12-----	-9.30	-.95	7.40	15.75
13-----	-9.06	-3.21	2.64	8.49
14-----	-9.71	-4.71	.29	5.29
15-----	-4.41	2.59	9.59	16.59
16-----	1.37	15.37	29.37	43.37
17-----	-8.65	3.85	16.35	28.85
18-----	-7.49	5.01	17.51	30.01
19-----	-9.85	-1.85	6.15	14.15
20-----	-10.36	-.86	8.64	18.14
21-----	-9.89	7.61	25.11	42.61
22-----	-10.83	9.17	29.17	49.17
23-----	-20.37	9.63	39.63	69.63

^{1/}Positive numbers represent maximum reductions in set-aside payments per acre which would allow producers to obtain the same net income from hay production on set-aside land as from 1972 uses of set-aside acreage.

^{2/}Price net to farmer at the field at harvesttime.

APPENDIX

Sample Data

Primary data for this study were developed for 23 groups of counties, termed subregions, each of which represented a relatively homogeneous type-of-farming area. Each subregion was composed of counties which (1) were considered by the researcher most familiar with the area to be typical (with respect to land resources and crop and livestock production patterns) of the entire type-of-farming area, (2) contained 10,000 or more acres of set-aside land in 1972, and (3) were estimated to include at least 50 farm operators who participated in the 1972 set-aside program and who also owned beef cows during 1972. Based on these criteria, the individual subregions contained from 11 to 36 counties each.

Two sample counties in each subregion were selected at random for intensive study. Agricultural Stabilization and Conservation Service (ASCS) personnel in each sample county provided a list of all farm operators in the county who participated in the feed grain, wheat, or upland cotton programs in 1972. A random sample of participating farm operators was then selected for each sample county. ASCS information on the 1972 set-aside participation rate and 1969 Census of Agriculture data indicating the proportion of farmers in the county with beef cow enterprises were used to estimate the sampling rate needed to provide a sample which would include at least 40 farm operators with both set-aside acreage and beef cows.

The presence or absence of beef cows on land operated by each sample farmer was then determined by county ASCS personnel, on the basis of personal knowledge or direct communication with the farmer. From the list of farmers with both set-aside land and beef cows, a final sample of 40 farm operators was randomly selected. The first 25 were designated as primary respondents, and the other 15 as alternates for a personal interview survey which was conducted in November and December 1972.

A total of 1,169 farmers were interviewed in the 23 study subregions combined. Fifty farmers per subregion, 25 per sample county, were interviewed in each subregion except subregions 3, 10, 13, 15, 19, 20, 21, 22, and 23. The discontinuation of a set-aside acreage requirement for compliance with provisions of the 1973 upland cotton program was announced before the survey could be conducted in one sample county of subregion 3, the Mississippi Delta. Because cotton accounted for more than three-fourths of all set-aside land in the subregion in 1972, no attempt was made to continue the survey after the program change announcement. Consequently, subregion 3 data are based on 25 records. A series of winter storms hindered travel during the survey period in subregions 13 and 15, reducing the number of successful interviews to 47 and 44, respectively. A total of 51 schedules was obtained in subregion 10, 62 were completed in subregion 20, and 60 each in subregions 19, 21, 22, and 23.

Subregional Expansion of Sample Results

Estimates of the number of farm operators in each subregion who participated in the set-aside program in 1972 and who also owned beef cows provided one basis for expanding planned changes in beef cow numbers on the sample farms to subregional totals. Farm numbers from the 1969 Census of Agriculture were used as an estimate of the number of farm operators eligible to participate in the set-aside program in 1972 in each subregion. Preliminary ASCS information--consisting of the number of ASCS farm units in each county eligible to participate and the number enrolled in one or more of the feed grain, wheat, and upland cotton programs in 1972--was used to estimate the average participation rate among the counties in each subregion.

The number of participating farm operators in the subregion was then estimated by multiplying the number of census farms in 1969 by the average set-aside participation rate. Next, the percentage of participating farm operators in the two sample counties who also owned beef cows was applied to the estimated number of participants in the subregion, yielding an estimate of the number of participating farm operators with beef cows in the subregion. Finally, this number was divided by the number of farm operators interviewed in the sample counties of the subregion during the survey to compute an expansion factor for each subregion. The product of the survey results and these expansion factors provided an estimate of the subregional totals.

The 1972 number of beef cows on participating farms in the 23 subregions, estimated on this basis, was 43 percent larger than the 1969 Census estimate for all farms in the study area (appendix table 1). Thus it appears that the number of beef cows owned by farmers who participated in the set-aside program in 1972 was larger than the average of all farms in the area. Also, estimates of changes in the total number of beef cows within the next 3 years under alternative provisions regarding the use of set-aside land may not be as large as reported in appendix table 2.

One possible reason for the generally high estimates derived by this method is that the sample farms in the survey may have had considerably larger beef cow herds than the average for the entire subregion. An alternative method for analyzing the impact of different set-aside program provisions on beef cow numbers would be to take account of the intensity of planned set-aside land use on the sample farms under the assumed alternative uses of set-aside acreage.

The acreage of set-aside land controlled by the farm operators who were surveyed in each subregion is shown in appendix table 3. Also shown for each hypothetical option concerning the use of set-aside land is the number of beef cows that would be added within 3 years, over and above the expansion planned with 1972 program provisions. According to the farmers surveyed, the added increases would range from less than one cow per 100 acres of set-aside land in subregion 11 to almost 41 cows per 100 acres in subregion 3, if year-round grazing were permitted over the next 3 years. If year-round grazing and hay harvesting from set-aside land were assured for 10 years, added increases in beef cow numbers per 100 acres of set-aside land would still amount to only 1.5 cows within 3 years in subregion 11. At the other extreme, sample producers in subregion 1 projected an added increase of 71.4 cows per 100 acres of set-aside land, implying that the availability of forage from set-aside land

Appendix table 1.--Beef cow numbers in study subregions, 1972 estimates based on farm numbers, compared with 1969 Census data

Subregion	Cows on sample farms, 1972	Estimated expansion factor ^{1/}	Estimated cows on participating farms in subregion, 1972	Census cows in subregion, 1969	1972 estimate as percent of 1969
	<u>Cows</u>		<u>Cows</u>	<u>Cows</u>	<u>Percent</u>
1-----	1,316	128.560	169,185	67,987	249
2-----	1,438	60.440	86,913	85,795	101
3-----	1,531	52.080	79,734	115,747	69
4-----	1,052	80.200	84,370	92,352	91
5-----	1,030	275.020	283,271	203,794	139
6-----	2,000	258.600	517,200	364,031	142
7-----	1,823	318.960	581,464	682,706	85
8-----	2,005	217.080	435,245	227,591	191
9-----	8,675	138.560	1,202,008	280,233	429
10-----	2,509	100.608	252,425	191,433	132
11-----	2,985	122.000	364,170	432,317	84
12-----	4,880	162.562	793,303	209,675	378
13-----	4,350	51.702	224,904	172,066	131
14-----	3,880	107.280	416,246	330,953	126
15-----	3,186	114.136	363,637	452,294	80
16-----	1,579	120.080	189,606	235,174	81
17-----	4,073	146.500	596,694	387,211	154
18-----	2,090	249.760	521,998	473,804	110
19-----	3,405	40.567	138,131	212,157	65
20-----	2,889	24.290	70,417	87,511	80
21-----	4,243	106.800	457,395	280,648	163
22-----	3,311	292.433	968,246	464,380	208
23-----	2,327	285.550	664,475	571,698	116
Total			9,461,037	6,621,557	143

^{1/} Expansion factor for each subregion was derived by dividing the estimated number of farmers that participated in the set-aside program and had beef cows in 1972 by the number of farm operators in the subregion who were included in the personal interview survey.

Appendix table 2.--Changes in beef cow numbers planned within 3 years, with alternative restrictions on the use of set-aside land, subregion totals estimated on the basis of farm numbers, 1972^{1/}

Subregion	: : Grazing for: 7 months ^{2/}	: : grazing for: 3 years	: : Year-round : grazing and hay : for 3 years	: : Year-round : grazing and hay : for 10 years ^{3/}
	: : Cows	: : Cows	: : Cows	: : Cows
1-----	26,998	100,662	136,531	187,698
2-----	39,226	49,932	52,522	54,336
3-----	17,759	37,550	42,862	46,039
4-----	38,897	65,122	70,095	88,300
5-----	91,032	132,960	180,688	206,815
6-----	145,850	287,305	329,974	340,835
7-----	224,867	293,443	307,477	334,908
8-----	174,098	196,675	239,005	316,937
9-----	253,565	423,162	435,078	542,047
10-----	43,463	67,910	78,474	99,199
11-----	114,680	122,732	128,588	136,518
12-----	141,917	178,493	195,074	230,838
13-----	43,740	58,372	64,472	85,774
14-----	93,226	110,391	137,426	165,318
15-----	50,562	68,253	87,656	98,499
16-----	83,696	162,228	168,472	190,087
17-----	102,550	132,729	149,284	190,304
18-----	121,633	203,305	219,539	294,467
19-----	24,178	113,304	117,766	165,757
20-----	21,472	49,284	64,198	81,226
21-----	61,230	195,873	212,150	275,321
22-----	226,636	384,549	410,868	437,187
23-----	247,857	394,345	402,911	481,437
	:	:	:	:
Total	2,389,132	3,282,570	4,231,110	5,049,847

^{1/} Changes in beef cow numbers in the subregions were derived by multiplying changes planned on surveyed sample farms by estimated expansion factors in appendix table 1.

^{2/} Provisions identical to the 1972 set-aside program.

^{3/} Change planned in 3 years if option to graze year-round and harvest hay were assured for 10 years.

Appendix table 3.--Planned increases in beef cow numbers on survey farms with-
in 3 years, total and per 100 acres of set-aside land, with alternative re-
strictions on use of set-aside land, by subregion^{1/}

Increases in beef cow numbers beyond expansion planned with 1972 set-aside provisions ^{2/}							
Subregion	Set-aside: land on survey farms	Year-round grazing for 3 years		Year-round grazing and hay for 3 years		Year-round grazing and hay for 10 years ^{3/}	
		Per 100:		Per 100:		Per 100:	
		Total	acres	Total	acres	Total	acres
	Acres	Cows	Cows	Cows	Cows	Cows	Cows
1-----	1,750	573	32.74	852	48.69	1,250	71.43
2-----	3,097	177	5.72	220	7.10	250	8.07
3-----	928	380	40.95	482	51.94	543	58.51
4-----	2,039	327	16.04	389	19.08	616	30.21
5-----	2,230	167	7.49	326	14.62	421	18.88
6-----	2,278	547	24.01	712	31.26	754	33.10
7-----	1,679	215	12.91	259	15.43	345	20.55
8-----	3,145	104	3.31	299	9.51	658	20.92
9-----	8,540	1,224	14.33	1,310	15.34	2,082	24.38
10-----	8,104	243	3.00	348	4.29	554	6.84
11-----	11,875	66	.55	114	.96	179	1.51
12-----	5,249	225	4.29	327	6.23	547	10.42
13-----	3,608	283	7.84	401	11.11	813	22.53
14-----	10,197	160	1.57	412	4.04	672	6.59
15-----	3,686	155	4.21	325	8.82	420	11.39
16-----	5,091	654	12.85	706	13.87	886	17.40
17-----	8,131	206	2.53	319	3.92	599	7.37
18-----	6,005	327	5.45	392	6.53	692	11.52
19-----	17,767	2,197	12.37	2,307	12.98	3,490	19.64
20-----	12,028	1,145	9.52	1,759	14.62	2,460	20.45
21-----	8,570	1,249	14.57	1,400	16.34	1,986	23.17
22-----	5,074	540	10.64	630	12.42	720	14.19
23-----	4,482	513	11.45	543	12.12	818	18.25

^{1/}Derived from survey data.

^{2/}Increases in beef cow numbers over and above expansion already planned within 3 years at the time of the farm operator survey in 1972.

^{3/}Increases in beef cow numbers expected within 3 years if option to graze year-round and harvest hay were assured for 10 years.

would result in more intensive use of, or additions to, other land resources devoted to cattle raising.

The total acreage of set-aside land in each subregion in 1972 was available from ASCS data (see text, table 3). The proportion of this total acreage that was estimated to be controlled by farm operators with beef cows in the sample counties of each subregion, shown in table 6, was assumed applicable for the entire subregion. Thus, an estimate of the set-aside acreage on all farms with both beef cows and set-aside land in each subregion was derived.

Subregional increases in beef cow numbers estimated on the basis of planned set-aside use intensity on sample farms are presented in appendix table 4. The estimates for most subregions are similar to those derived with expansion factors based on farm numbers (appendix tables 2 and 4). ^{19/} For the study area as a whole, however, the estimates in appendix table 4 may be preferable, since they indicate relatively smaller increases in beef cow numbers in subregions 1, 8, 9, 12, 17, and 21--six of the subregions in which 1972 cow inventories and expansion plans appear most likely to have been overestimated through the use of subregional expansion factors based on farm numbers (appendix tables 2 and 4).

Data collected in the 1972 SRS June Enumerative Survey provided an independent estimate of the 1972 set-aside acreage operated by all farmers with beef cows in each State. No comparable data were available on which to base estimates of the number of farmers outside the study subregions with both set-aside land and beef cows in 1972. Thus, planned increases in beef cow numbers per 100 acres of set-aside land on sample farms surveyed in this study were used in estimating regional expansions in beef cow inventories.

^{19/} In appendix table 2, numbers in the column headed "Grazing for 7 months" must be subtracted from numbers in the other three data columns for each subregion to obtain estimates directly comparable to those in appendix table 4.

Appendix table 4.--Changes in beef cow numbers planned within 3 years, with alternative restrictions on the use of set-aside land, subregion totals estimated on the basis of additional cows per 100 acres of set-aside land^{1/}

: Set-aside : Increases in beef cow numbers beyond expansion				
: land on : planned with 1972 set-aside provisions				
: farms : Year-round : Year-round : Year-round				
: with beef : grazing for : grazing and hay : grazing and hay				
Subregion	cows ^{2/}	3 years	for 3 years	for 10 years ^{3/}
	100 acres	Cows	Cows	Cows
1-----	1,411	47,178	70,162	102,931
2-----	1,615	9,238	11,466	13,033
3-----	554	22,686	28,775	32,415
4-----	1,523	24,429	29,059	46,010
5-----	7,102	53,194	103,831	134,086
6-----	5,097	123,379	159,332	168,711
7-----	4,616	59,131	71,225	94,859
8-----	5,055	16,732	48,073	105,751
9-----	5,682	81,423	87,162	138,527
10-----	7,121	21,363	30,549	48,708
11-----	9,965	5,481	9,566	15,047
12-----	4,265	18,297	26,571	44,441
13-----	1,257	9,855	13,965	28,320
14-----	11,823	18,562	47,765	77,914
15-----	8,534	35,928	75,270	97,202
16-----	5,187	66,653	71,944	90,254
17-----	11,019	27,878	43,194	81,210
18-----	9,053	49,339	59,116	104,291
19-----	7,032	86,986	91,275	138,108
20-----	2,589	24,647	37,851	52,945
21-----	5,875	85,599	95,998	134,890
22-----	14,951	159,079	185,691	212,155
23-----	4,472	51,204	54,201	81,614
:				
:				
Total	135,828	1,097,261	1,452,041	2,043,422
:				
:				

^{1/}

Increases in beef cows per 100 acres of set-aside land on survey farms, table 17, applied to estimated total set-aside land in the subregion on farms with both set-aside acreage and beef cows in 1972. Estimated increases in beef cow numbers over and above expansion already planned within three years at the time of the farm operators survey in 1972.

^{2/}

Derived from tables 3 and 6.

^{3/}

Increase in beef cow numbers expected within three years if option to graze year-round and harvest hay were assured for ten years.

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